# 5000/5100
# Reference Manual

*Version 1.02*

*Mar. 6, 07*

This page is a reverse of the preceding page; they are for identifying a draft version.

When the document is converted to PDF, they are to be replaced by the designed cover and a blank page. To identify version of a PDF document, use the stamp tool. (Draft / Final / For Public Release / Revised … etc.)

# STATEMENTS

## *Copyright*

© Syntech Information Co., Ltd. 2004 All rights reserved.
This document, as well as any software included, may not be reproduced, stored in retrieval system or transmitted, in any form or by any means, without prior written consent of the copyright owners.

## *Trademark*

The CIPHER LAB® logo is a registered trademark of Syntech Information Co., Ltd.

## *Disclaimer of Liability*

Efforts have been made to ensure the accuracy of the information presented in this document. In the interest of improving internal design, operational function, and/or reliability, Syntech reserves the right to make changes to the products described in this document without prior notice. Syntech does not assume any liability that may occur due to the use or application of the product(s) or circuit layout(s) described herein.

## *Technical Support*

For product consultancy and technical questions, please contact your local sales representative. For more information, please visit our website.

*http://www.cipherlab.com*

# *FCC Regulations*

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

# *Technical Standards*

This equipment has been tested and found in compliance with the following technical standards:

- Low Voltage Directive (LVD) – EN 60950
- Electromagnetic Compatibility (EMC) – EN 55022, EN 55024, EN 61000

# CONTENTS


REVISION HISTORY ..... I

PREFACE ..... III

CARE & MAINTENANCE ..... 1

GETTING READY ..... 2

1. INTRODUCING 5000/5100 ..... 3

*1.1 Product Highlights* ..... *3*
*1.2 Nomenclature* ..... *4*
1.2.1 Inside Enclosures ..... 5
1.2.2 Dimensions ..... 8
*1.3 Features* ..... *9*
1.3.1 Power ..... 9
1.3.2 CPU ..... 12
1.3.3 Memory & Calendar ..... 12
1.3.4 Keyboard ..... 14
1.3.5 LCD ..... 15
1.3.6 Status LEDs ..... 16
1.3.7 Buzzer ..... 16
1.3.8 Readers ..... 16
1.3.9 Digital Inputs ..... 17
1.3.10 Digital Outputs ..... 18
1.3.11 RS-232 ..... 19
1.3.12 RS-485 ..... 20
1.3.13 Ethernet ..... 22
1.3.14 Programming Support ..... 23
*1.4 Unpacking the package* ..... *24*
*1.5 Options* ..... *24*

**2. INSTALLING 5000/5100 ..... 25**

*2.1 Setting up the terminal ..... 25*
*2.2 Wiring ..... 30*
2.2.1 Pin Assignments ..... 31
2.2.2 RS-232 ..... 33
2.2.3 RS-485 ..... 34
2.2.4 Digital Inputs/Outputs ..... 36

**3. SYSTEM ARCHITECTURE ..... 37**

*3.1 Operation ..... 40*
*3.2 Download ..... 41*
*3.3 Management ..... 42*

**4. CONFIGURING 5000/5100 ..... 43**

*4.1 Identifying current menu ..... 43*
*4.2 Selecting from menus ..... 44*
*4.3 System Menu ..... 46*
4.3.1 Information ..... 47
4.3.2 Settings ..... 48
4.3.3 Tests ..... 52
4.3.4 Memory ..... 54
4.3.5 Power ..... 55
4.3.6 Load Program ..... 56
4.3.7 NET Menu ..... 57

*4.4 Program Manager* ..... *63*
4.4.1 Download ..... 64
4.4.2 Activate ..... 67
4.4.3 Version ..... 68
*4.5 Kernel Menu* ..... *69*
4.5.1 Information ..... 70
4.5.2 Load Program ..... 71
4.5.3 Kernel Update ..... 72
4.5.4 Test & Calibrate ..... 72

**5. MANAGING 5000/5100** ..... **73**

*5.1 For proprietary applications* ..... *74*
*5.2 For custom applications* ..... *74*

**SPECIFICATIONS** ..... **75**

**TROUBLESHOOTING** ..... **77**

**APPENDIX I – MOUNTING TEMPLATE** ..... **79**

Table 1: Power consumption ..... 10
Table 2: Memory explained ..... 12
Table 3: Keypad explained ..... 14
Table 4: Display formats ..... 15
Table 5: Types of readers ..... 16
Table 6: Decide resistance value ..... 17
Table 7: Optional accessories ..... 24
Table 8: Stages of installation ..... 25
Table 9: Types of interfaces ..... 30
Table 10: Pin Assignment of JP2 ..... 31
Table 11: Pin Assignment of JP3 ..... 32
Table 12: D/I groups ..... 36
Table 13: D/O groups ..... 36
Table 14: Purposes of software modules/menus ..... 40
Table 15: Application programs ..... 41
Table 16: Management programs ..... 42
Table 17: Function keys used in selecting from menus ..... 44
Table 18: Default system settings ..... 48
Table 19: Downloading interfaces ..... 56
Table 20: Listing of multiple programs and font ..... 64
Table 21: Downloading spare programs ..... 65
Table 22: Downloading active program or font ..... 66
Table 23: Device code explained ..... 70

Figure 1: References for setting up system ..... 2
Figure 2: Nomenclature of terminal ..... 4
Figure 3: Components inside terminal ..... 7
Figure 4: Physical dimensions ..... 8
Figure 5: Installing battery pack ..... 11
Figure 6: Installing memory card ..... 13
Figure 7: Keypad layout ..... 14
Figure 8: D/I sample circuit ..... 17
Figure 9: An example of RS-232 connection ..... 19
Figure 10: RS-485 topology ..... 20
Figure 11: An example of RS-485 connection ..... 21
Figure 12: An example for Ethernet networking ..... 22
Figure 13: Installing Ethernet card ..... 23
Figure 14: Drilling holes & assembling cables ..... 26
Figure 15: Mounting to wall ..... 27
Figure 16: Wiring & connecting ..... 28
Figure 17: Assembling enclosures ..... 29
Figure 18: Terminal blocks ..... 30
Figure 19: RS-232 wiring ..... 33
Figure 20: Terminator's switch ..... 34
Figure 21: RS-485 wiring ..... 35
Figure 22: System Architecture ..... 39
Figure 23: Function keys as menu indicators ..... 45
Figure 24: System Menu ..... 46
Figure 25: Program Manager menu ..... 63
Figure 26: Kernel Menu ..... 69
Figure 27: Remote management ..... 73
Figure 28: Mounting template ..... 79

Screen 1: Status lights as menu indicators ..... 43
Screen 2: System Menu> 1. Information ..... 47
Screen 3: System Menu> 2. Settings ..... 48
Screen 4: System Menu> 2. Settings> 1. Clock ..... 48
Screen 5: System Menu> 2. Settings> 2. Backlight Period ..... 49
Screen 6: System Menu> 2. Settings> 3. CPU Speed ..... 49
Screen 7: System Menu> 2. Settings> 4. Key Click ..... 50
Screen 8: System Menu> 2. Settings> 5. System Password ..... 50
Screen 9: System Menu> 2. Settings> 6. Font ..... 51
Screen 10: System Menu> 3. Tests ..... 52
Screen 11: System Menu> 4. Memory ..... 54
Screen 12: System Menu> 5. Power ..... 55
Screen 13: System Menu> 6. Load Program ..... 56
Screen 14: System Menu> 7. Net Menu ..... 57
Screen 15: System Menu> 7. Net Menu> 1. Information ..... 57
Screen 16: System Menu> 7. Net Menu> 2. IP Setting ..... 59
Screen 17: System Menu> 7. Net Menu> 3. Echo Tests ..... 60
Screen 18: System Menu> 7. Net Menu> 3. Echo Tests: Client Mode ..... 61
Screen 19: System Menu> 7. Net Menu> 4. Download via TCP/IP ..... 62
Screen 20: Program Manager> 1. Download ..... 64
Screen 21: Program Manager> 2. Activate ..... 67

# REVISION HISTORY

| *Version* | *Release Date* | *Notes* |
|---|---|---|
| 1.00 | Dec. 2004 | Initial release |
| 1.01 | Jan. 12, 2005 | Revised as per the following: |
| | | 1. Styles updated |
| | (Sec. 3.2 & 4.3.6) | 2. Font file - downloading interface: RS-232 only |
| | (Sec. 5) | 3. Update Figure 27 “Remote Management” |
| 1.02 | May 16, 2005 | Revised as per the following: |
| | | 1. Update “Page Heading 1” style (centered) |
| | (Sec. 2.2.2) | 2. Correct RS-232 pinouts figure on page 31 |
| | (Sec. 3 & 4.4) | 3. Add program name 51pm.shx on page 35, 59 for Program Manager |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

This page is intended to be blank.

# PREFACE

The 5000/5100 stationary batch terminals are intended for versatile data collection applications with its large and expandable database capacity, and allow programmable solutions to meet varying needs of customers. Various operational parameters can be configured, such as backlight control, buzzer control, graphic screen and output format.

Integrated with a proximity reader and backlit keypad, the 5000 terminal simply satisfies general needs regarding large data collection. Based on the 5000 terminal, the 5100 terminal comes with a backlit LCD for displaying information. Alternatively, both models can make use of a battery pack for achieving a non-interruptible operation during power outage. Without such power backup, the terminals will not function during a power fail, but all transaction and configuration data stored in memory will be maintained by the 3V lithium button cell for at least one week.

The 5000/5100 terminals can be easily added to your legacy networks. Multiple networking options include RS-232, RS-485 and 10/100Base-T Ethernet. Moreover, detachable terminal blocks make it easy and flexible to connect with other external devices, such as a reader, door switch, siren, door sensor, electronic lock, etc.

This manual serves to guide you through how to install, configure, and operate the 5000/5100 terminals. The Care & Maintenance section is specifically prepared for those who are in charge of taking care of the terminals.

We recommend you to keep one copy of the manual at hand for quick reference or maintenance purposes. To avoid any improper disposal or operation, please read the manual thoroughly before use.

Thank you for choosing the CipherLAB products!

This page is intended to be blank.

# CARE & MAINTENANCE

This is specifically prepared for those who are in charge of taking care of the terminals, such as a terminal operator or maintenance engineer.

Here are some tips on how to take care and maintain the terminals.

## *Taking care of the terminal*

- Always keep electric equipments like the terminals away from any flammable sources.
- Always make sure there is stable power supply for the terminal to operate properly.
- This terminal is intended for indoor use. It may do damage to the terminals when being exposed to extreme temperatures or soaked wet.
- When the body of the terminal gets dirty, use a clean and wet cloth to wipe off the dust. DO NOT use/mix any bleach or cleaner. Always keep the LCD dry.
- For a liquid crystal display (LCD), DO NOT use any pointed or sharp objects to move against the surface.

## *Maintaining the terminal*

- If you want to put away the terminal for a period of time, download the collected data to a host first, and then take out the battery pack. Store the terminal and battery pack separately.
- When the terminal resumes its work, the rechargeable main and backup batteries will take a certain time to become fully charged.
- If you shall find the terminal malfunctioning, refer to the Troubleshooting section for self help first.
- If the problem persists, please write down the specific scenario and consult your local sales representative.
- In no circumstances, users are allowed to repair components.

# GETTING READY

If you are using the terminal for the first time, the illustration below gives outline of the system and section references.

Access to the configuration menus needs to disconnect the external and internal power connection of the terminal first. Therefore, we suggest that you do all the configuration and downloading jobs before setting up the system on site.

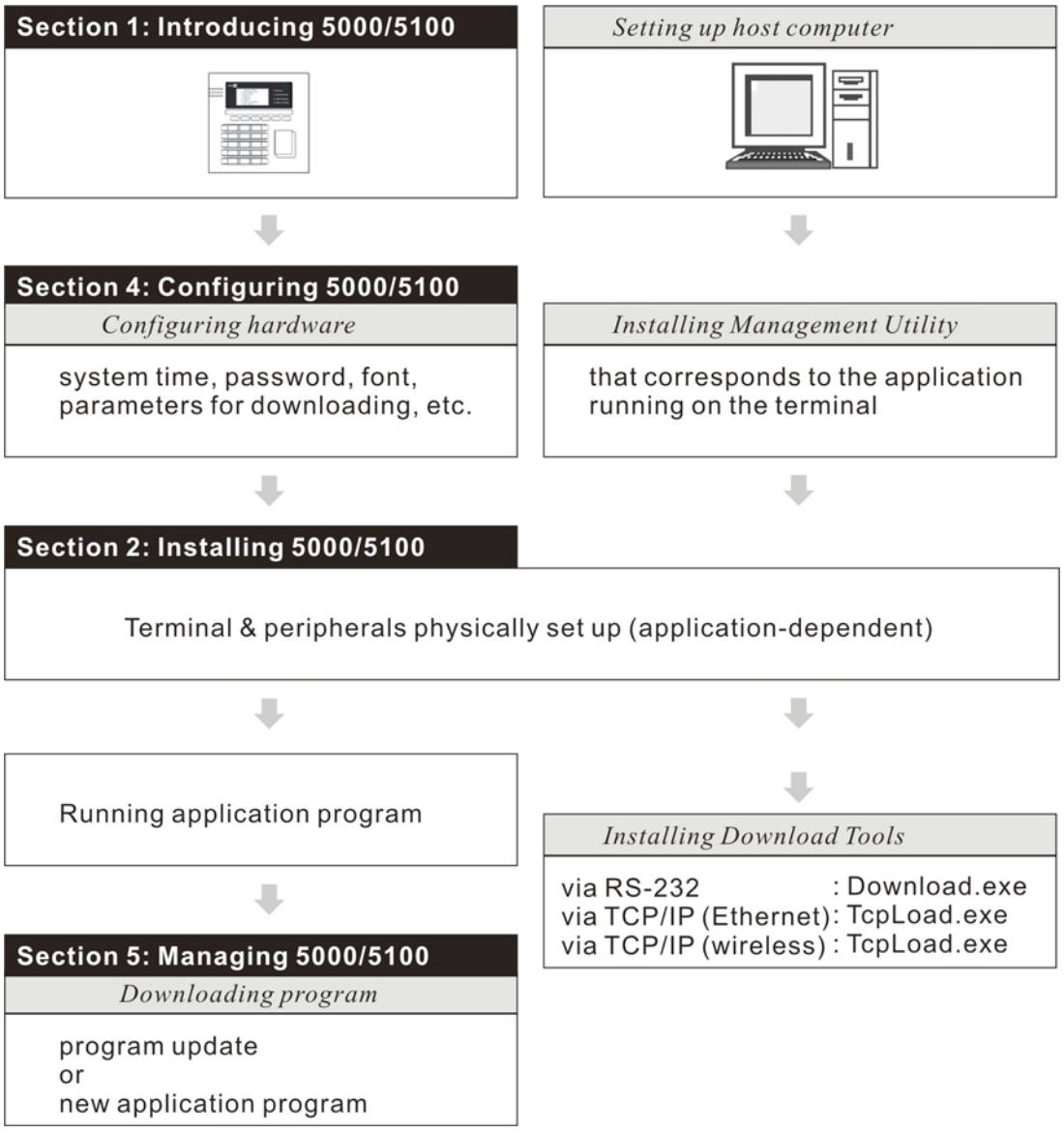

Section 1: Introducing 5000/5100
Setting up host computer
Section 4: Configuring 5000/5100
Configuring hardware
system time, password, font, parameters for downloading, etc.
Installing Management Utility
that corresponds to the application running on the terminal
Section 2: Installing 5000/5100
Terminal & peripherals physically set up (application-dependent)
Running application program
Installing Download Tools
via RS-232 : Download.exe
via TCP/IP (Ethernet): TcpLoad.exe
via TCP/IP (wireless) : TcpLoad.exe
Section 5: Managing 5000/5100
Downloading program
program update or new application program

*Figure 1: References for setting up system*

# 1. INTRODUCING 5000/5100

This section mainly explains the hardware construction and features of the 5000/5100 terminals. The 5100 terminal looks similar to the 5000 terminal except for the screen.

## *1.1 Product Highlights*

- 2, 4 or 8 MB for expandable data memory, powered by backup cell
- Graphic LCD supports double-byte languages
- Battery operated when AC power is interrupted (if the battery pack is installed)
- Tamper switch to activate the buzzer during removal of enclosures
- 4 Digital Input & 4 Digital Output for monitoring/controlling external devices
- Programmable signals to accommodate custom applications
- Programming support: OCX, BASIC and C
- OCX component supports TCP/IP, RS-232 and Modem communications

# 1.2 Nomenclature

The pictures below show the major components:

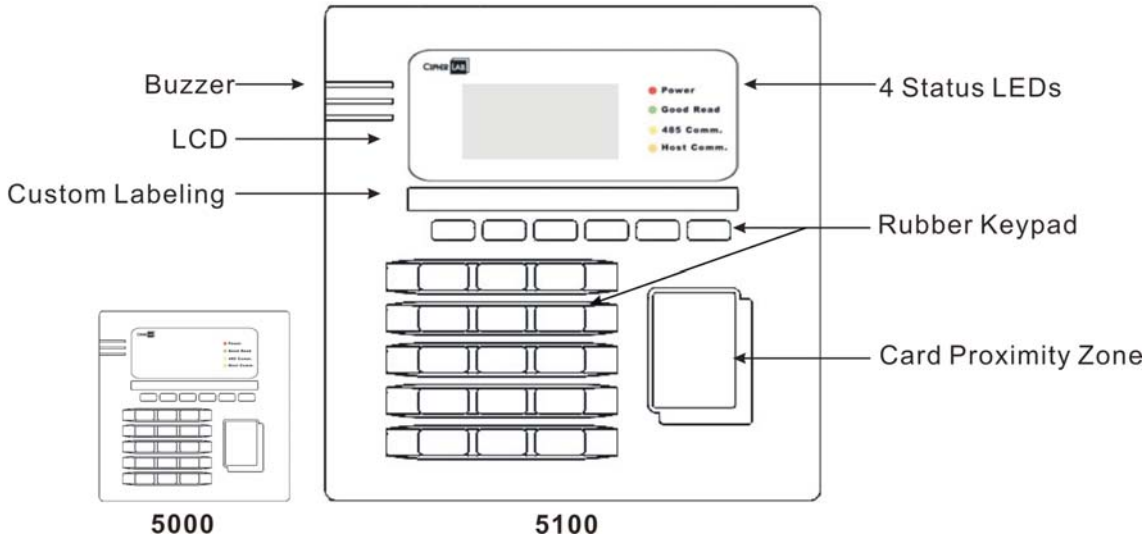



*Figure 2: Nomenclature of terminal*

## 1.2.1 Inside Enclosures

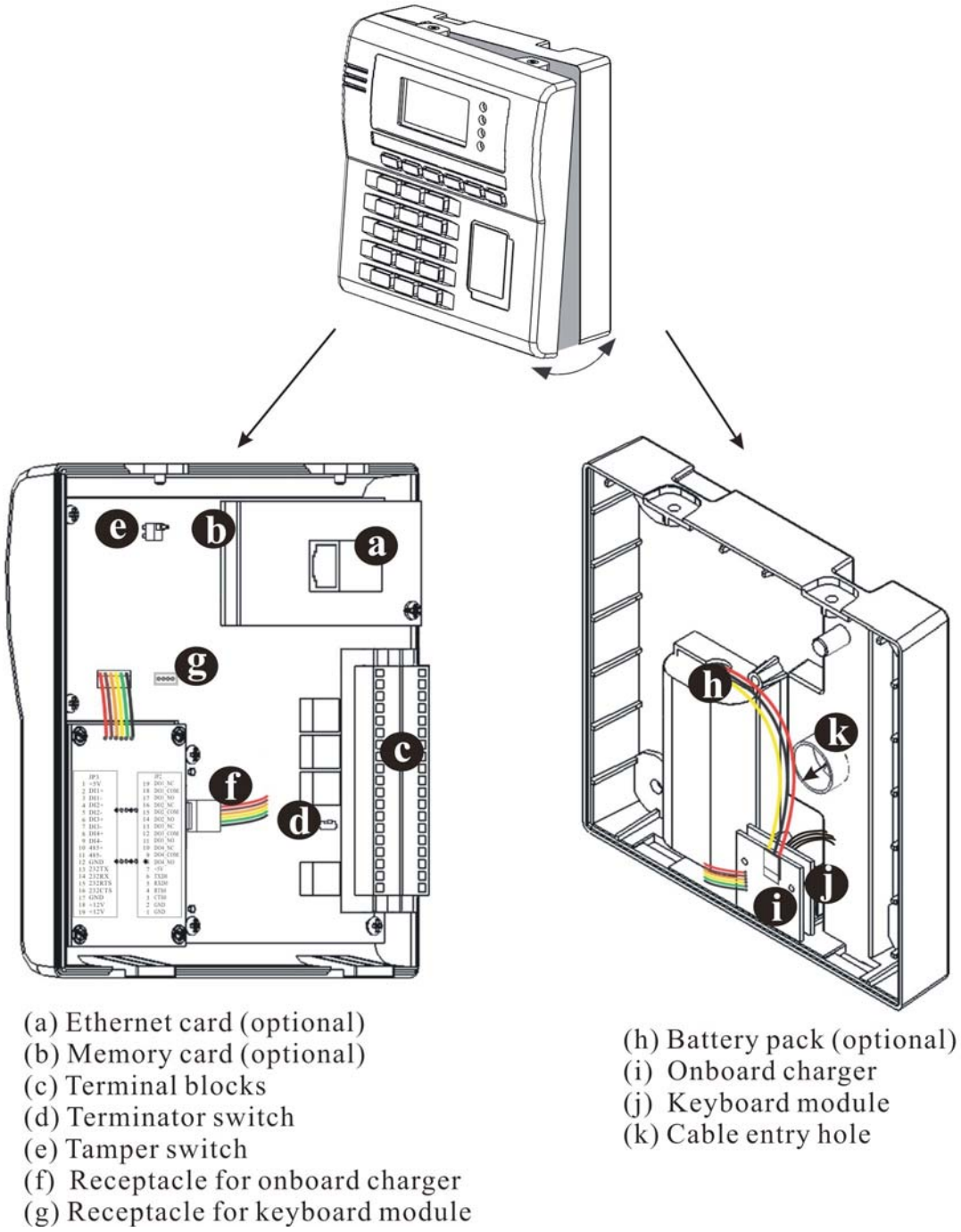



*Figure 3: Components inside terminal*

## 1.2.2 Dimensions

These drawings provide 3-sided views with dimensions, which are helpful in choosing a suitable location for installation.

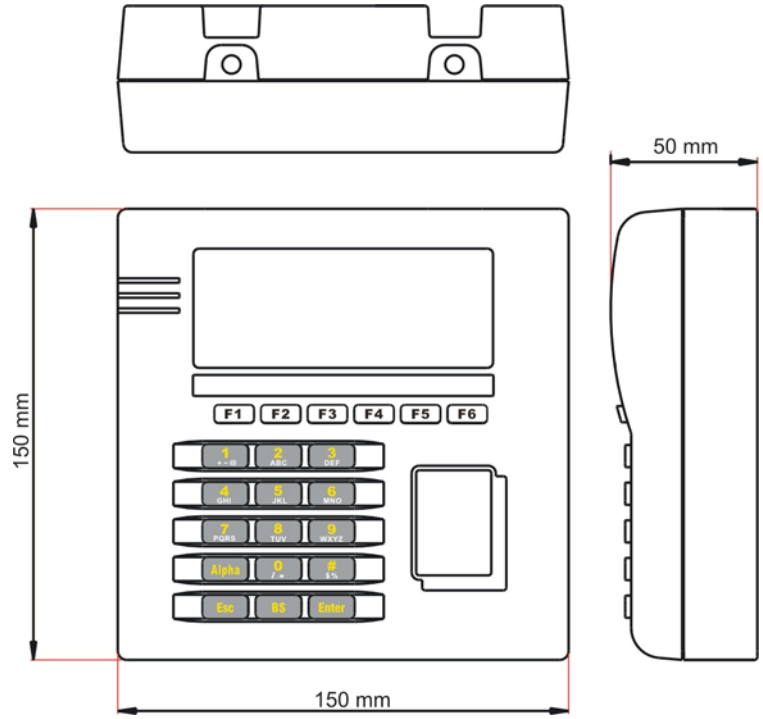



*Figure 4: Physical dimensions*

# 1.3 Features

## 1.3.1 Power

### Line Power & Main Battery

A 12 V/ 1000 mA wall adaptor is used to power the 5000/5100 terminals. Furthermore, an optional 7.4 V/ 2000 mAh Li-ion battery pack provides more than six extra hours of uninterrupted operations when the line power is down. Such power switching mechanism is actuated by a power switch, which seamlessly switches between the line power and the battery pack without any user's intervention.

When the line power is resumed and the battery pack has been used up, an on-board battery charging controller fully charges the battery pack within twenty hours. This controller chip helps to assure fast and safe charge by monitoring/controlling the battery voltage, temperature, charging current and so on. It also includes a mechanism to provide protection from over charging.

***When a power outage occurs, the main battery is to maintain operation for more than six hours.***

### Backup Battery

In addition, one 3.0 V/7 mAh rechargeable Lithium button cell on the main board retains data in SRAM and maintains the running of the real-time clock and calendar. It takes at least twenty-four hours to fully charge the backup battery.

For a fully charged backup battery, it can last for at least one week.

## Power Consumption Status

The System Menu provides information on power consumption.

l Monitor voltage level: Line / Main / Backup

**>> Also see Section 4.3.5 Power**

For the 5100 terminal, the smart battery icon will replace the plug icon on the screen when it is battery-operated. Here is another way to tell a low or discharged main battery from the screen.

l Examine the levels of the smart battery icon

Utilizing the low voltage/power technology, the terminal draws very little power. The power consumption is estimated in different conditions as follows:

| | | | |
|---|---|---|---|
| ***EM reader –*** | backlight off: | 55 | mA @ +12V |
| | backlight on: | 125 | mA @ +12V |
| | backlight on, charging: | 240 | mA @ +12V |
| ***Mifare reader –*** | backlight off: | 75 | mA @ +12V |
| | backlight on: | 155 | mA @ +12V |
| | backlight on, charging: | 275 | mA @ +12V |

*Table 1: Power consumption*

It can be easily seen that there are still some rooms for the adaptor's supply capability. However, it is strongly recommended to use other supplies to power heavy loads such as door locks, alarms and so on. Also, if possible, keep these heavy loads electrically isolated from the terminal. Electronic equipments such as the terminal tend to be upset by surges from surrounding "noisy" devices.

## Installing Battery Pack

If there is any need to replace the battery pack, follow the instructions described below.

1. Seat the battery pack into the battery compartment at the lower enclosure.
2. Connect the battery wires to the receptacle on the charger.

***To access the configuration menus, disconnect the battery wires and external line power.***

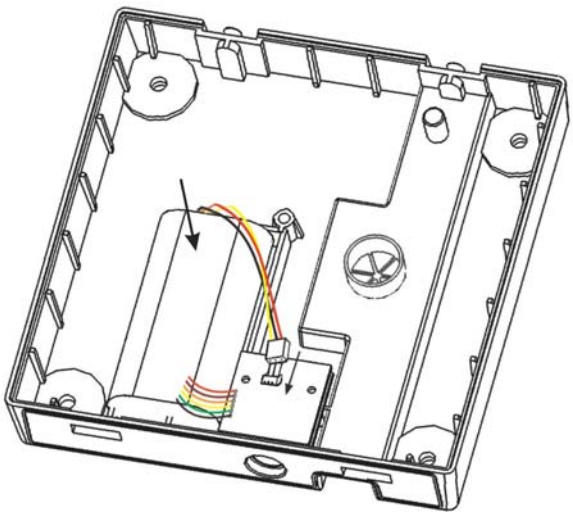


*Figure 5: Installing battery pack*

## 1.3.2 CPU

A 16-bit low power CMOS CPU is utilized. With little current consumed, yet, this CPU can run under 22.1184MHz and provide more than 6 MIPS of computation powers.

## 1.3.3 Memory & Calendar

In the event of a power failure with no battery pack installed, the 7 mAh button cell on the main board is to keep contents of the SRAM and run the calendar for at least 1 week.

An optional memory card upgrades memory to 2, 4, or 8 Mbytes SRAM with its own contents backup button cell. The DIP switch on the card must be set ON for the cell to work.

| |
|---|
| ***Program memory:*** |
| - 2 Mbytes flash memory for core, OS, application software, fonts, etc. |
| ***Data memory:*** |
| - 256 Kbytes SRAM with contents backup by a 7 mAh rechargeable Li button cell. |
| ***Calendar:*** |
| - A calendar chip is also equipped for accurate time/date logging.<br>- Non-stop operation is also provided through the same Li button cell for SRAM contents backup. |

*Table 2: Memory explained*

## Installing Memory Card

1. Align pinholes at the back of the card to the pins on the main PCB.
2. Press down the card flatly. Be careful not to bend or distort any pins.
3. Then apply the screw to screw down to the pole.

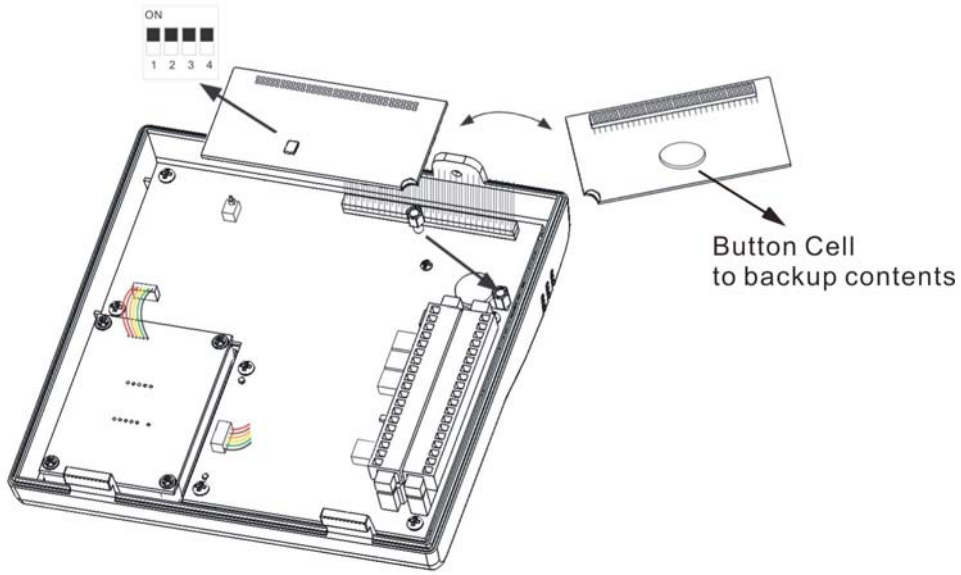



*Figure 6: Installing memory card*

## 1.3.4 Keyboard

A 21-key keypad is for system setup, user entry and so on.

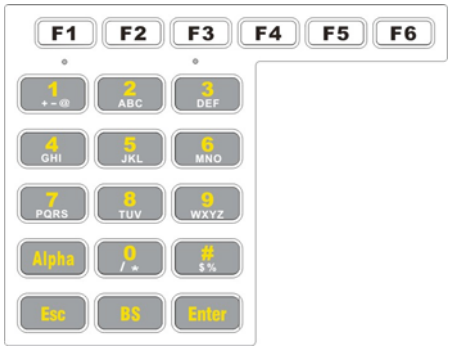



*Figure 7: Keypad layout*

Silicon rubber has been chosen for their durability and prompt feedback. The key click can be configured through the System Menu.

***>> Also see Section 4.3.2 Settings***

These keys can be categorized into two groups:

| |
|---|
| ***Function keys (F1~F6):*** |
| - User-definable, each comes with a GREEN LED underneath.<br>- Can be used to show the current system status such as working shifts, etc.<br>- Also, in combination with the graphic LCD, user-friendly graphic selection menu can be implemented. |
| ***Alphanumeric keys:*** |
| - The alphanumeric keypad layout is similar to phone keypad, and also with GREEN LED backlight. Default input mode is numeric.<br>- Capital letters mode: press the Alpha key once and A appears on the screen.<br>- Small letters mode: press the Alpha key twice and a appears on the screen. |

*Table 3: Keypad explained*

### *Optional External Keyboard*

The 5000/5100 terminals provide one keyboard port. You may connect an external keyboard to this port.

1. Connect wires from the keyboard module to the receptacle on the main PCB.
2. Connect the external keyboard to the PS/2 port.

## 1.3.5 LCD

The 5100 terminal comes with a 128 by 64 pixels FSTN graphic LCD, which is able to display message in formats as follows:

| | | |
|---|---|---|
| ***English fonts:*** | (6_8 pixels) | 21 by 8 lines |
| | (8_16 pixels) | 16 by 4 lines |
| ***Chinese fonts:*** | (16_16 pixels) | 8 by 4 lines |
| ***Other language fonts, company logo, etc.*** | | Programmable |

*Table 4: Display formats*

The LED backlight helps ease reading under dim environments, and can be configured through the System Menu.

***>> Also see Section 4.3.2 Settings***

Also, other language fonts, company logo and so on can be shown to accommodate varying application needs.

## 1.3.6 Status LEDs

There are four indicators on the front panel for status feedback. They are programmable for diagnostics and application dependant.

- Red LED – Power
- Green LED – Good Read
- Yellow LED – 485 Comm.
- Orange LED – Host Comm.

## 1.3.7 Buzzer

The buzzer is a low power transducer type, and its pitch and duration are software programmable.

## 1.3.8 Readers

Two types of readers are supported:

| | |
|---|---|
| ***125 KHz EM:*** | From contact to 6 cm |
| ***13.56 MHz, Philips Mifare:*** | From contact to 6 cm |

*Table 5: Types of readers*

A second reader can be attached via the JP2 “external reader port”. Please note that these are “CMOS level” (0~+5V) signals. A +5V output is also available on the JP2 and can be used to power this external reader.

## 1.3.9 Digital Inputs

There are totally 4 groups of digital inputs. Each is electrically isolated from the outside world by a photo-coupler. Current must flow through the internal LED to turn on the output transistor.

***A typical 1 mA turn-on current is recommended.***

A sample circuit is depicted below.

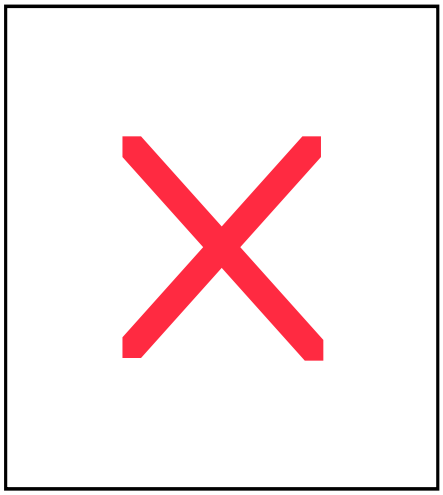


*Figure 8: D/I sample circuit*

| ***How to decide the R value?*** |
| --- |
| Premise: the LED forward voltage is about 1.15 V.<br>The recommended R is<br>Kohms when Vext = 5.0 V, and 10 Kohms when Vext = +12 V. |

*Table 6: Decide resistance value*

## 1.3.10 Digital Outputs

There are totally 4 groups of digital outputs. Each is a relay that is able to sustain 1 A under 30 VDC or 0.3 A under 125 VAC. Both normal open (NO) and normal close (NC) contacts are provided to accommodate application needs.

These relays are sufficient to provide direct control over normal house door electric lock, alarm and so on. External high power relays might be needed for turnstile, automatic doors and so on to satisfy “heavy loads”.

So, before connecting any devices to the terminals, please check their power ratings thoroughly.

## 1.3.11 RS-232

A standard RS-232 port is available on the JP3. Unlike the “external reader port”, these signals are true RS-232C compliant. With proper cabling, shielding, wiring and so on, it is able to communicate to another device up to 50 feet (approx. 15 meters) away.

This port is mainly used to communicate to the host computer, i.e. being a stand-alone unit or master terminal under multi-station systems. The final use, of course, is not limited.

The illustration below shows a typical topology of networking a standalone terminal to a host through RS-232 interface.

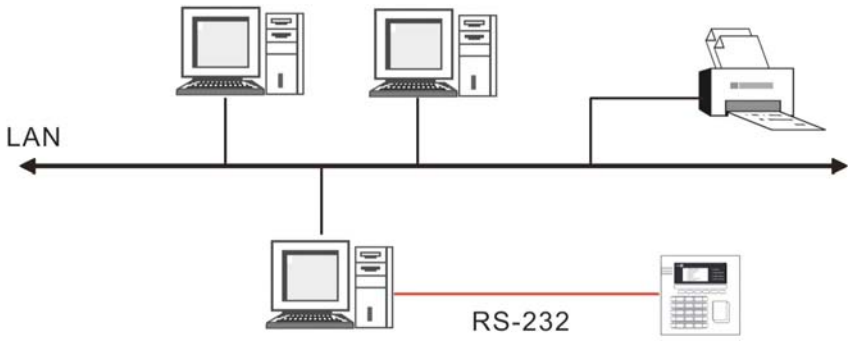



*Figure 9: An example of RS-232 connection*

## 1.3.12 RS-485

A standard RS-485 port is also available on the JP3 to constitute multi-station systems. Though it is simple and low cost, care must be taken to ensure proper operations.

- The data rate is 125 kbps.
- Compatible to CipherLAB 510, 520 and so on.
- Maximum network run length is 1000 meters
- No fork, nor star connections. As depicted below, connections b, d & f are acceptable but not others.

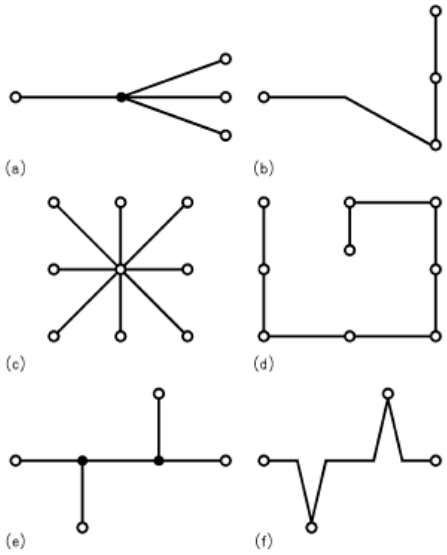



*Figure 10: RS-485 topology*

- Use AWG 22, shielded twist cables or Cat 5 UPT cables.
- Terminators help to absorb reflections and should be placed at both “physical” ends. A slide switch turns on/off an on-board termination circuitry.
- For the RS-485 network to work properly, a unique station ID has to be assigned to each terminal first.

The illustration below shows a typical topology of networking multiple terminals through RS-232 and RS-485 interfaces.

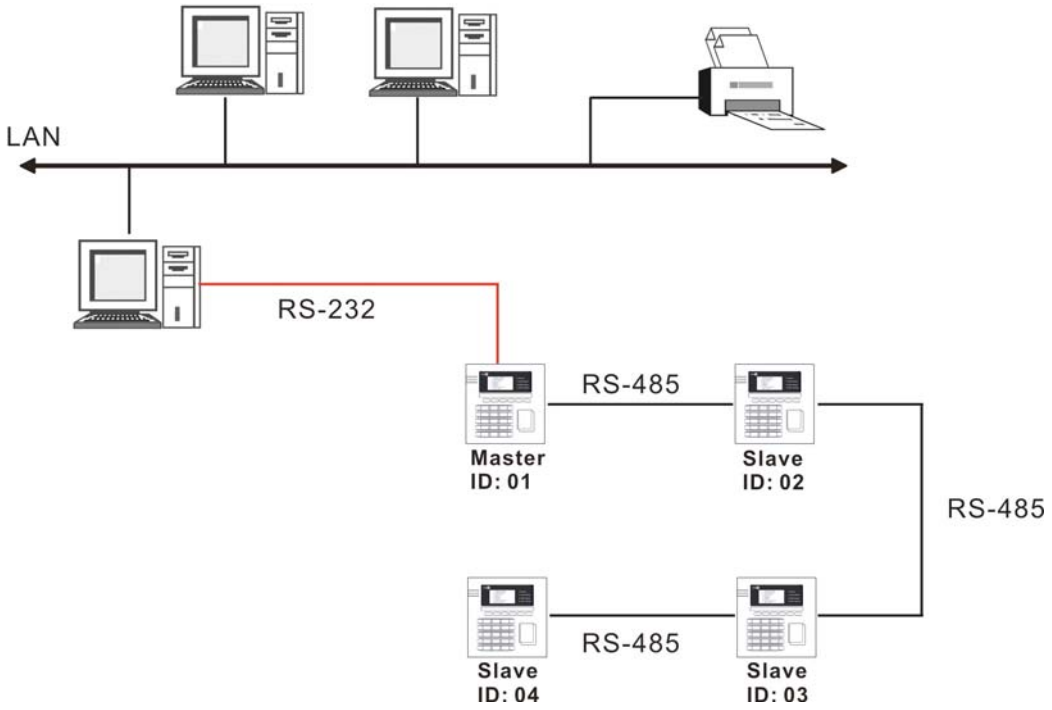



*Figure 11: An example of RS-485 connection*

## 1.3.13 Ethernet

An optional 10/100 Base-T Ethernet card can be attached to merge the terminals onto any existing legacy Ethernet networks. It comes with a standard RJ-45 connector and is fully standard compliant. Just like the RS-485, the IP address must be set accordingly.

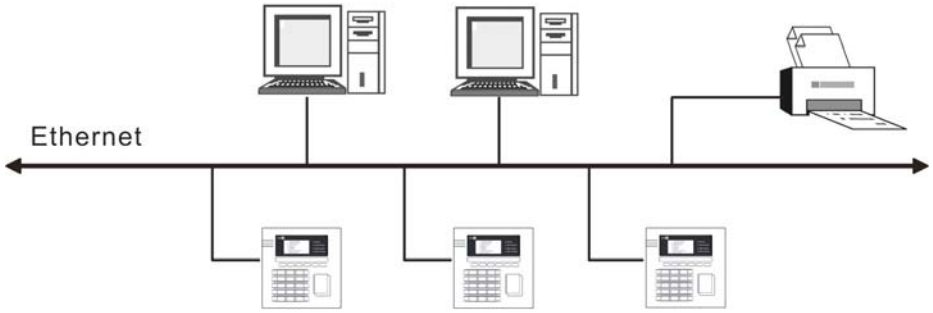



*Figure 12: An example for Ethernet networking*

### *Installing Ethernet Card*

You may have to install the Ethernet card to the terminal by yourself. If you have installed a memory card, attach the Ethernet card on top of it then.

1. Align the pinholes at the back of the card to the pins on the main PCB.
2. Press down the card flatly. Be careful not to bend or distort any pins.
3. Then apply the screw to screw down to the pole.

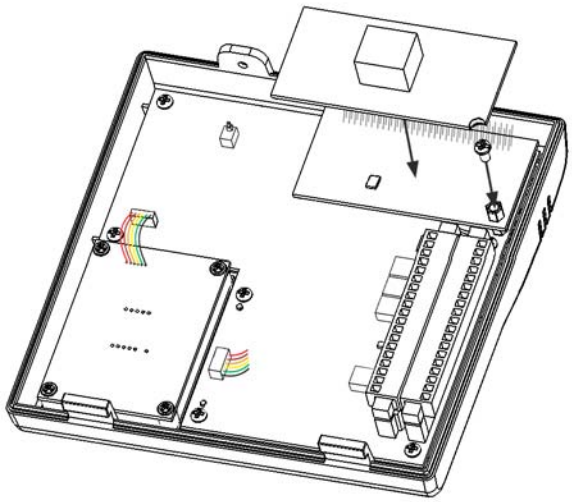


*Figure 13: Installing Ethernet card*

## 1.3.14 Programming Support

For custom applications, development tools include BASIC and C compliers.

In addition, OCX support is also available for proprietary 5100*.SHX application programs.

# 1.4 Unpacking the package

The following items are included in the package. Save the box and packaging material for future use when you need to store or ship the terminal.

- The 5000 or 5100 Terminal
- Power Adaptor
- Software CD & Reference Manual (for authorized distributors only)

# 1.5 Options

There are several optional accessories to enhance the total performance of the terminals. Some of them may be ordered separately, and therefore, require you to install them to the main PCB by yourself.

For installation details, please refer to relevant sections.

| | |
|---|---|
| ***Memory card:*** | 2, 4 or 8 MB SRAM for data memory |
| ***Reader:*** | Built-in RFID reader, Mifare or EM type |
| ***Battery pack:*** | Rechargeable Li battery for non-stop operation |
| ***Ethernet card:*** | RJ-45 port for 10/100Base-T Ethernet networking |

*Table 7: Optional accessories*

# 2. INSTALLING 5000/5100

## *2.1 Setting up the terminal*

The whole installation can be simply classified into the following stages:

| |
|---|
| ***Site Survey:*** |
| Choose a location that is close to the target door and provides clearance for the cables and access to an AC outlet. |
| ***Mounting:*** |
| - Drill holes on the wall.<br>- Mount the lower enclosure on the wall. |
| ***Attaching:*** |
| Attach optional accessories to the PCB. |
| ***Wiring & Connecting:*** |
| - Connect wires to terminal blocks.<br>- Connect connectors to receptacles.<br>- Connect to Ethernet networks. |
| ***Assembling:*** |
| Secure enclosures. |
| ***Power Supplying:*** |
| Connect to an appropriate wall outlet. |

*Table 8: Stages of installation*

The site survey should take both location and topology into consideration. And the actions specified for each stage should be taken with care to avoid any damages to the terminals or peripherals.

***To ensure proper wiring and safe operation, we strongly recommend that the terminals be set up by an experienced electrician.***

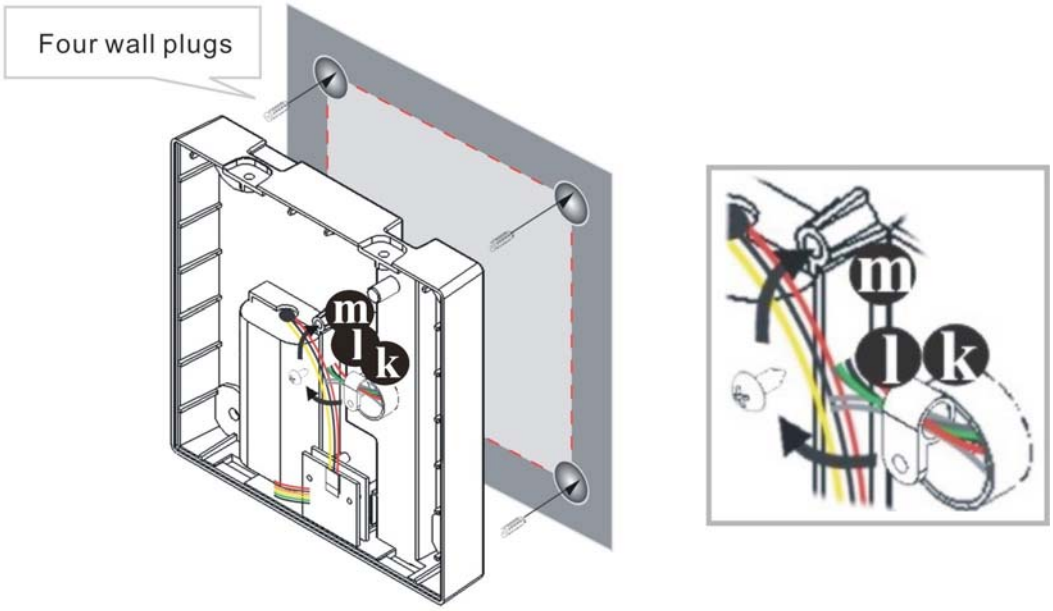



*Figure 14: Drilling holes & assembling cables*

## *Drilling Holes & Assembling Cables*

1. Make use of the mounting template provided in the appendix, and drill four holes in an appropriate location for installing the terminal:

   - Each hole shall be 6 mm in diameter and 21 mm in depth.
   - The four holes enclose a square of 120 mm x 120 mm.

2. Insert the four wall plugs (screw anchors for concrete surface) into the four holes. Make sure each of them is completely inside a hole.

3. Pull cables through the cable entry hole (k). Apply the two-piece cable holder (l) to organize the in-coming cables, and secure the holder to the pole (m) by screw.

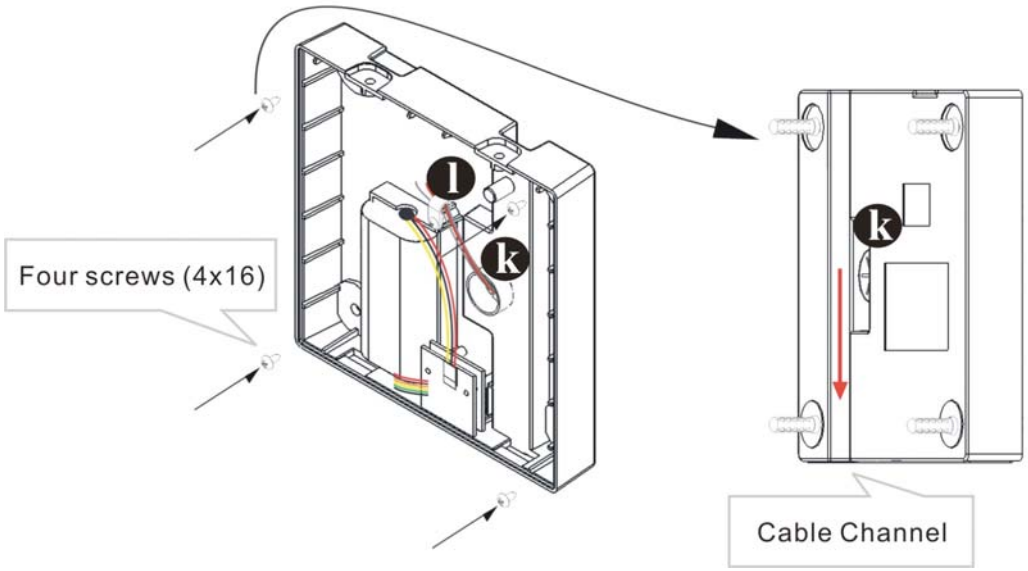



*Figure 15: Mounting to wall*

## *Mounting to the Wall*

4. Make sure the cables are routing and arranged in the cable channel at the back. Such design is to keep cables invisible and inaccessible from the outside.

5. Apply four 4x16 screws to mount the lower enclosure on the wall.

## *Attaching Optional Items*

6. Attach the battery pack, memory card and Ethernet card, if there is any.

***>> Also see Sections 1.3 Features & 1.5 Options***

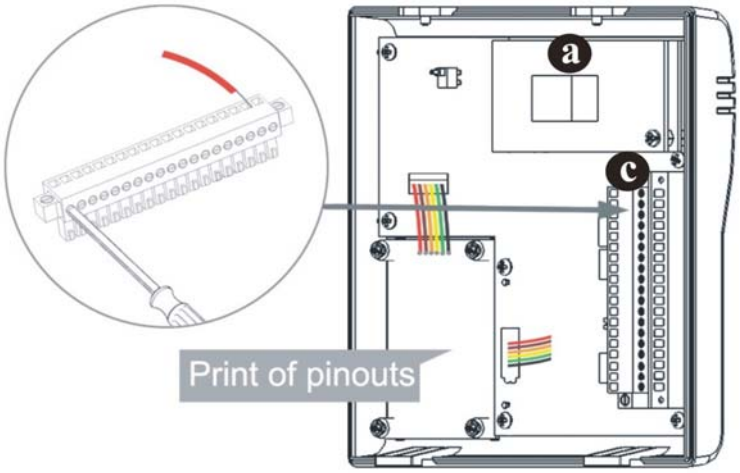



*Figure 16: Wiring & connecting*

## *Wiring & Connecting*

7. Attach connectors of the keyboard module, reader module, charger or battery pack to receptacles on the PCB.

8. Follow the wiring instructions to insert every wire to a corresponding slot of the terminal blocks c. Tighten screws to secure wires. Then plug the terminal block in to the PC board socket.

   - Connect line power.
   - Connect digital inputs and outputs.
   - Connect RS-232, if necessary
   - Connect RS-485, if necessary

9. If the Ethernet card a is installed, simply connect a standard networking cable (two ends with RJ-45 connectors) to the Ethernet ports on the module and your networking device.

***Proceed to enable TCP/IP and set other networking parameters.***

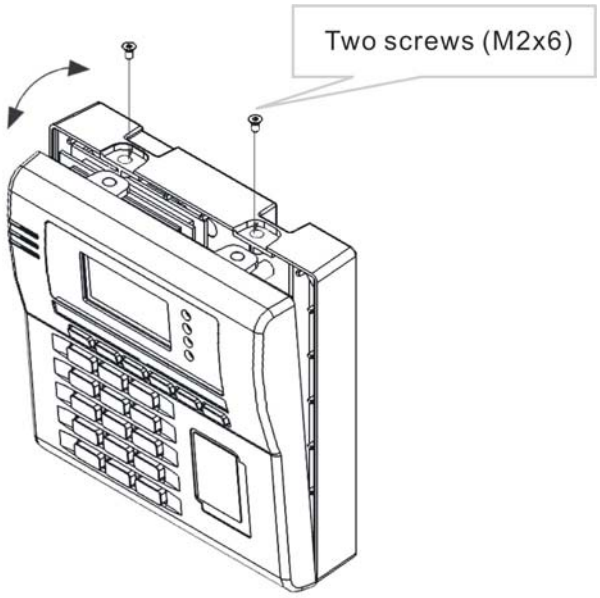



*Figure 17: Assembling enclosures*

## Assembling Enclosures from Bottom to Top

10. Make sure there is no more need to do hardware configuration and/or downloading application program.

    At last, position the two tabs at the bottom of the upper enclosure into the notches at the bottom of the lower enclosure. The two pieces of enclosures snap to fit.

11. Apply two M2x6 screws to secure the upper enclosure to the lower enclosure on top.

## Connecting to Power

12. Connect the power adaptor to an outlet.

***When being installed for the first time, both the battery pack and the button cell for memory backup take a certain time to be fully charged.***

# 2.2 Wiring

This section gives instructions on how to wire the terminal to external devices, a host, or another terminal.

| | |
|---|---|
| ***RS-232 (JP3)*** | Connect to a host computer |
| ***RS-485 (JP3)*** | Connect to another terminal |
| ***Digital inputs (JP3)*** | Connect to external devices like an actuator (button) to open door |
| ***Digital outputs (JP2)*** | Connect to external devices like door lock, siren, etc. |

*Table 9: Types of interfaces*

To ease installation and maintenance, most of the wirings (except for the Ethernet) are through JP2 and JP3. These connectors are detachable terminal blocks. That means, soldering is not required and these terminal blocks can be separated from the main PCB easily.

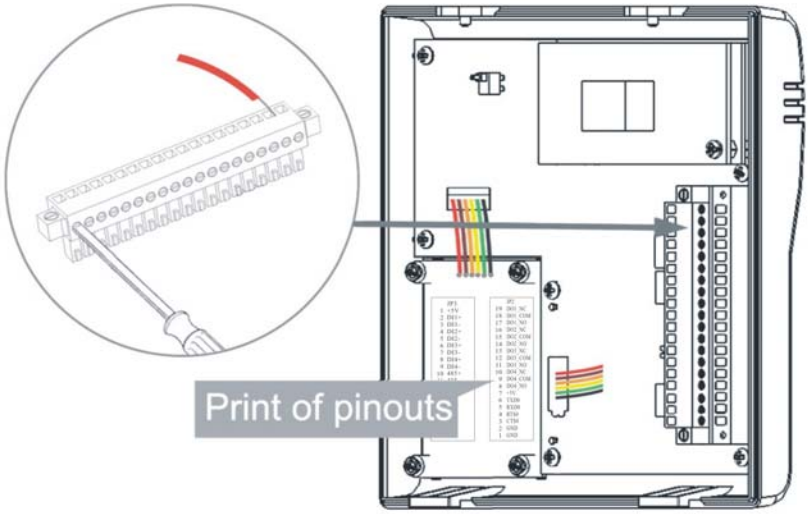



*Figure 18: Terminal blocks*

## 2.2.1 Pin Assignments

The pin assignments are listed and described below.

### *JP2:*

| *Pin No.* | *Name* | *Category* | *Description* |
|---|---|---|---|
| 1 | GND | Power | Ground |
| 2 | GND | Power | Ground |
| 3 | CTS0 | From External reader | CMOS-level clear to send |
| 4 | RTS0 | To External reader | CMOS-level request to send |
| 5 | RXD0 | From External reader | CMOS-level receive data |
| 6 | TXD0 | To External reader | CMOS-level transmit data |
| 7 | +5V | Power | +5V/200mA to power external devices |
| 8 | DO4_NO | Digital output | #4, normal open |
| 9 | DO4_COM | Digital output | #4, common |
| 10 | DO4_NC | Digital output | #4, normal close |
| 11 | DO3_NO | Digital output | #3, normal open |
| 12 | DO3_COM | Digital output | #3, common |
| 13 | DO3_NC | Digital output | #3, normal close |
| 14 | DO2_NO | Digital output | #2, normal open |
| 15 | DO2_COM | Digital output | #2, common |
| 16 | DO2_NC | Digital output | #2, normal close |
| 17 | DO1_NO | Digital output | #1, normal open |
| 18 | DO1_COM | Digital output | #1, common |
| 19 | DO1_NC | Digital output | #1, normal close |

*Table 10: Pin Assignment of JP2*

## *JP3:*

| *Pin No.* | *Name* | *Category* | *Description* |
|---|---|---|---|
| 1 | +5V | Power | Same as JP2 pin 7, i.e. total current can be drawn from these two pins is 200 mA |
| 2 | DIN1+ | Digital input | #1 positive side (anode) |
| 3 | DIN1- | Digital input | #1 negative side (cathode) |
| 4 | DIN2+ | Digital input | #2 positive side |
| 5 | DIN2- | Digital input | #2 negative side |
| 6 | DIN3+ | Digital input | #3 positive side |
| 7 | DIN3- | Digital input | #3 negative side |
| 8 | DIN4+ | Digital input | #4 positive side |
| 9 | DIN4- | Digital input | #4 negative side |
| 10 | 485+ | RS-485 | Non-inverting |
| 11 | 485- | RS-485 | Inverting |
| 12 | GND | Power | Ground |
| 13 | TXD1 | RS-232 to external device | Transmit data |
| 14 | RXD1 | RS-232 from external device | Receive data |
| 15 | RTS1 | RS-232 to external device | Request to send |
| 16 | CTS1 | RS-232 from external device | Clear to send |
| 17 | GND | Power | Ground |
| 18 | Vsys | System power | +12V (from adaptor) or main battery |
| 19 | Vsys | System power | +12V (from adaptor) or main battery |

*Table 11: Pin Assignment of JP3*

## 2.2.2 RS-232

Without using additional devices like optical isolators or signal boosters, the cable length is limited to 50 feet (approx. 15 meters) to ensure communication quality according to IEEE standard.

### *Instructions*

Make use of a 9-pin female connector (DB-9) at PC end, and wire pins as follows:

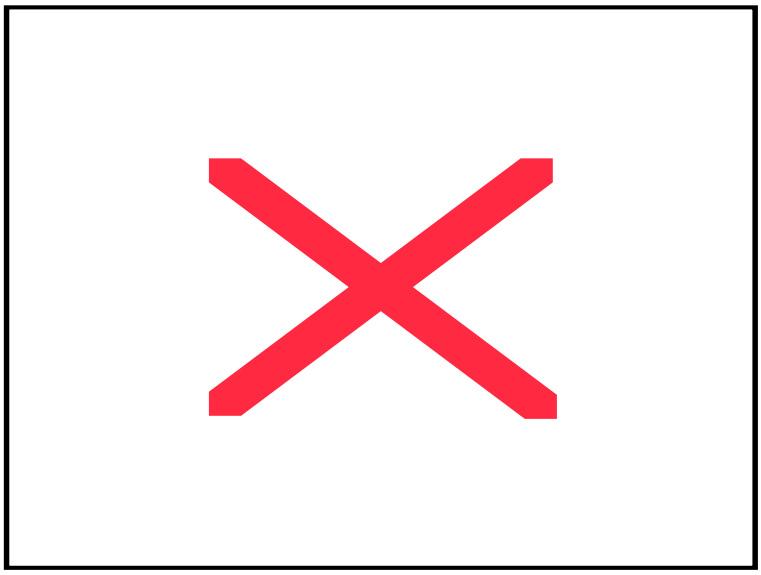


*Figure 19: RS-232 wiring*

### *Wiring materials:*

Use 22 ~ 24 AWG braided shielded cable.

## 2.2.3 RS-485

Connections between every two terminals are set up through RS-485 interface. When more than two of the terminals are connected (as a multi-station system), a host only needs to connect to the first one terminal (master) and it can then communicate with the rest terminals (slave).

On the last slave device, a termination resistor is usually essential. There is one terminator on the PCB of each terminal, and a DIP switch (s1) is beside JP3. When the terminal serves as the last one slave device, please turn on the switch.

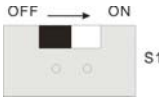



*Figure 20: Terminator's switch*

***Slide the DIP switch to the right position on the last salve device.***

To establish such RS-485 connection, the following settings need to be done first on the hardware of the terminals. For preloaded applications, set parameters from the front panel by entering the Setup Menu.

***>> Also see Section 3. System Architecture***

- Line Connection:
  Only the device connected to a host is named "Master", the rest are all "Slave".

- Station ID:
  Assign a unique ID (01 ~ 99) to each terminal.

- Maximum station ID:
  Set a value (01 ~ 99) as the maximum station ID of the polling list on the Master.

***For RS-485 connection without any repeaters, up to 32 stations can be connected.***

## Instructions

When settings are completed, you may proceed with physical connection between every two terminals.

To set up RS-485 connection, the communications cable must be wired as shown below:

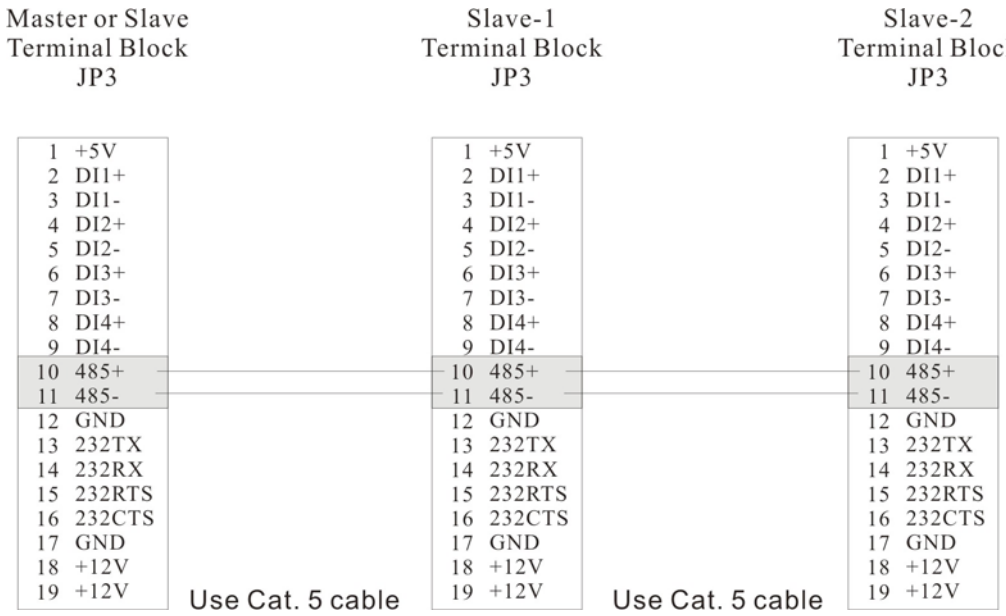



*Figure 21: RS-485 wiring*

## Wiring materials:

Please use 22 AWG braided shielded cable or Cat 5 UTP (Unshielded Twisted Pair) cable. The maximum cable length can be up to 1000 meters.

## 2.2.4 Digital Inputs/Outputs

DI/DO are four sets of separate signal on the terminals.

### *DI via JP3*

D/I type: A photo-coupler that can be used to monitor external devices.
For example, a button can be used to activate and open a door.

DI wiring allows four groups of signals and is done through JP3.

| *DI Group No.* | *Pin No. (+)* | *Pin No. (–)* | *Pin No. (+5V)* | *Pin No. (GND)* |
|---|---|---|---|---|
| DIN1 (Default) | 2 | 3 | 1 | 17 or 12 |
| DIN2 | 4 | 5 | 1 | 17 or 12 |
| DIN3 | 6 | 7 | 1 | 17 or 12 |
| DIN4 | 8 | 9 | 1 | 17 or 12 |

*Table 12: D/I groups*

### *DO via JP2*

D/O type: A relay that can be used to control external devices.
For example, an alarm can be activated for alerting abnormal status.
Or, a door lock switch to lock the door for a certain condition.

DO wiring allows four groups of signals and is done through JP2.

| *DO Group No.* | *Pin No. (Normal Open)* | *Pin No. (Common)* | *Pin No. (Normal Close)* |
|---|---|---|---|
| DO1 (Default) | 17 | 18 | 19 |
| DO2 | 14 | 15 | 16 |
| DO3 | 11 | 12 | 13 |
| DO4 | 8 | 9 | 10 |

*Table 13: D/O groups*

# 3. SYSTEM ARCHITECTURE

The whole system can be simplified as hardware and software at PC end and terminal end. The software inside the terminal mainly consists of three modules: Kernel, System, and Program. For system configurations and managing multiple programs, each terminal comes with System Menu, Kernel Menu, and Program Manager.

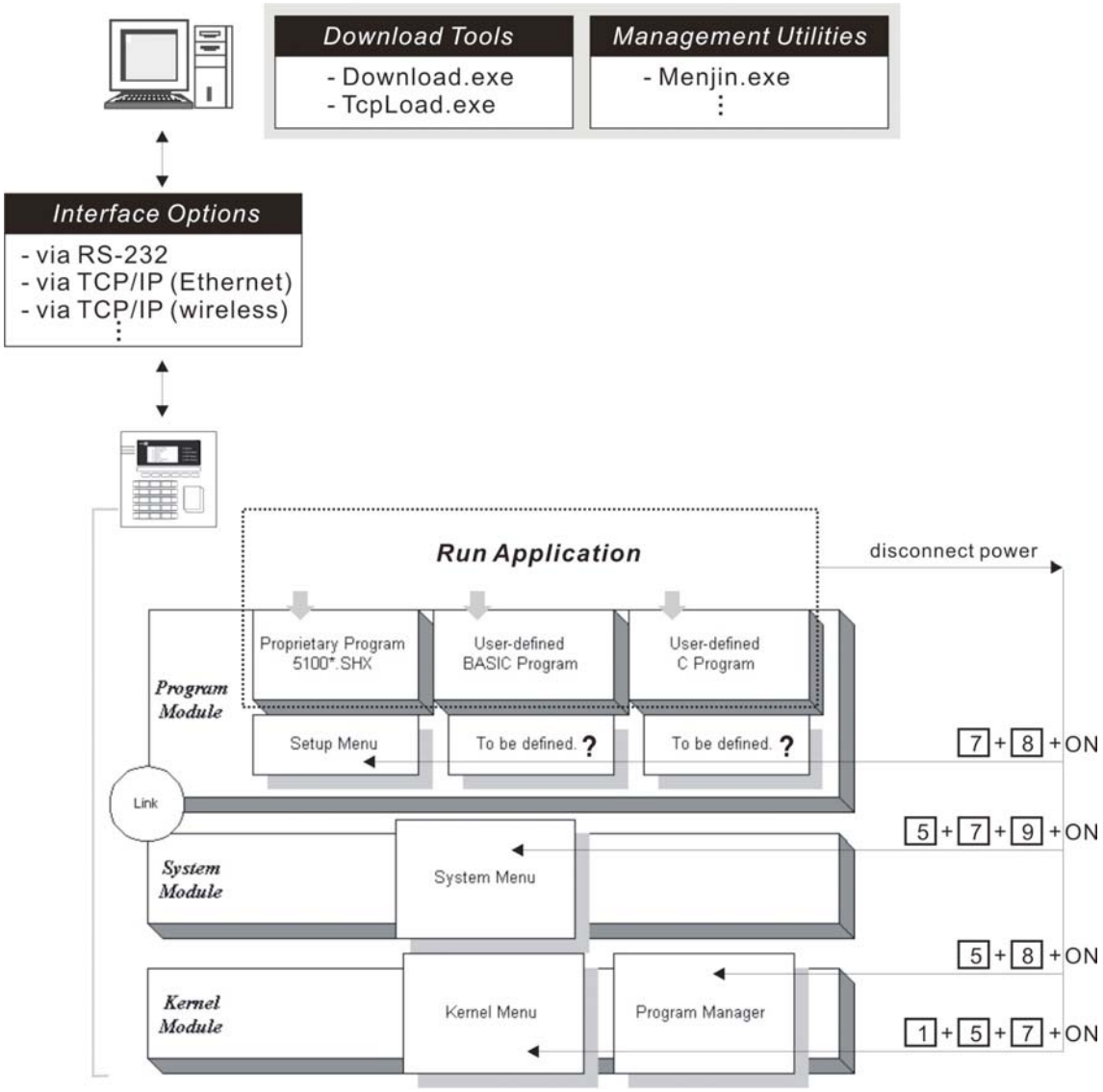



*Figure 22: System Architecture*

***Program Manager Menu, which is generated by 51pm.shx, is unavailable by default. Please download 51pm.shx in the System Manu first.***

According to different purposes for which the modules serve, the software inside the terminal also can be viewed in the following way:

| *Menus* | *Purposes* |
|---|---|
| Setup Menu<br>OR<br>User-defined menu | Setup Menu is generated by the proprietary 5100*.SHX program. The menu functions and access keys depend on the application program you download to the terminal. |
| System Menu | A portal to system configurations. |
| Kernel Menu | Generally, this is for manufacturing use only. |
| Program Manager | A portal to manage multiple programs. |

*Table 14: Purposes of software modules/menus*

Because the 5000 terminal comes without the LCD screen, we suggest you keep the manual at hand while configuring the terminals.

# *3.1 Operation*

After being properly configured and physically set up together with peripherals, the terminal is ready to work when a corresponding management utility is ready at PC end.

Applications scope include Access Control system, Time & Attendance, Shop Floor Control, etc. It depends on which application program is running.

***Proper configuration is very important for a system that consists of a number of terminals.***

# 3.2 Download

The terminal must be configured correctly for downloading either of the following:

- Program update
- New application program
- Font file (only RS-232 interface is allowed)

| ***Proprietary Application Programs (5100*.SHX):*** |
| --- |
| The following programs have been developed to meet varying application needs. One of them is preloaded inside the terminal.<br><br>- Access Control: 5100AC-MS-V1.0.SHX<br>- Time & Attendance: 5100T&A-V1.0.SHX<br>- Shop Floor (Work-in-Process, WIP): 5100SF-V1.0.SHX<br><br>Corresponding to each of these programs, a Setup Menu is available on the terminal for setting parameters. |
| ***Alternatives:*** |
| Aided by programming support, user-defined application programs can be developed to satisfy specific needs as being part of a system. |

*Table 15: Application programs*

# 3.3 Management

Install a management utility at PC end that corresponds to the current application. Then, proceed to define the environments for the terminal to work.

Please see programming guide for details.

***The terminal must be loaded with an appropriate application first.***

| ***Proprietary Management Software for 5100*.SHX:*** |
| --- |
| The software is in correspondence to proprietary application programs.<br><br>- Several PC end utilities are available for remote management. For example, Menjin.exe is for access control system.<br>- Aided by OCX support, customized management utilities can be developed.<br>- Command sets are mainly for managing the terminals. Yet, sending commands from a host can do part of the configuration as well. |
| ***Alternatives:*** |
| The custom management software is specifically in correspondence to user-defined application programs. |

*Table 16: Management programs*

# 4. CONFIGURING 5000/5100

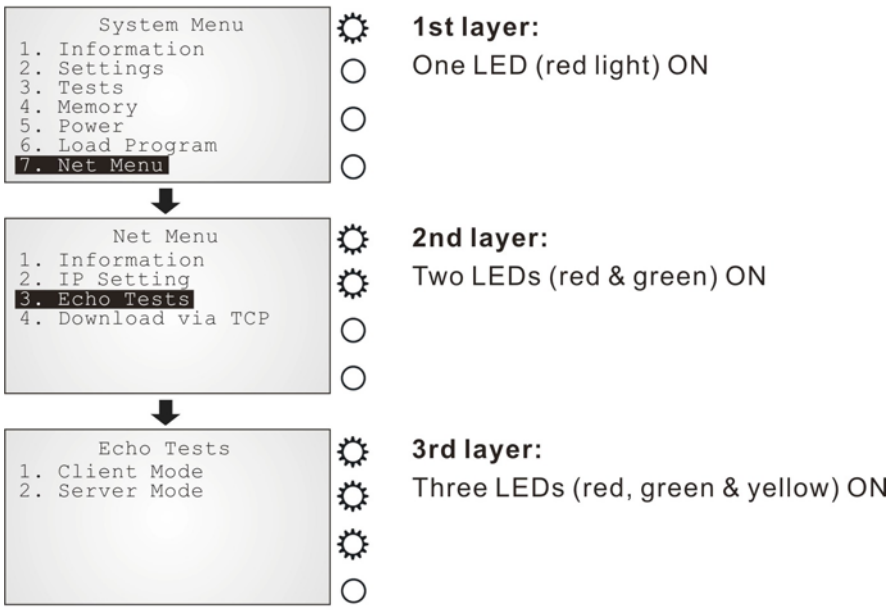
This section mainly describes the alternatives to configure the 5000/5100 terminals, including hardware configuration and downloading application programs.

Although the 5000 terminal is not equipped with a screen, you may proceed with configurations by following the LED indicators and relevant sample screens of menus in this manual.

***Without a screen, some menus are not operational on the 5000 terminal.***

## *4.1 Identifying current menu*

With or without a screen, the LEDs on the front panel will indicate the current layer of menus when configuring settings.




*Screen 1: Status lights as menu indicators*

# 4.2 Selecting from menus

The function keys can also be used in selecting item from menus on the screen.

- To select item 1 to 5 on any menu, simply press [F1] to [F5].
- To select item 6 on any menu, press [F6] then [F1].
- To select item 7 on any menu, press [F6] then [F2].

| | | |
|---|---|---|
| F1 | = | 1 + [Enter] |
| F2 | = | 2 + [Enter] |
| F3 | = | 3 + [Enter] |
| F4 | = | 4 + [Enter] |
| F5 | = | 5 + [Enter] |
| F6 | = | Next page |
| F6 followed by F1 | = | 6 + [Enter] |
| F6 followed by F2 | = | 7 + [Enter] |

*Table 17: Function keys used in selecting from menus*

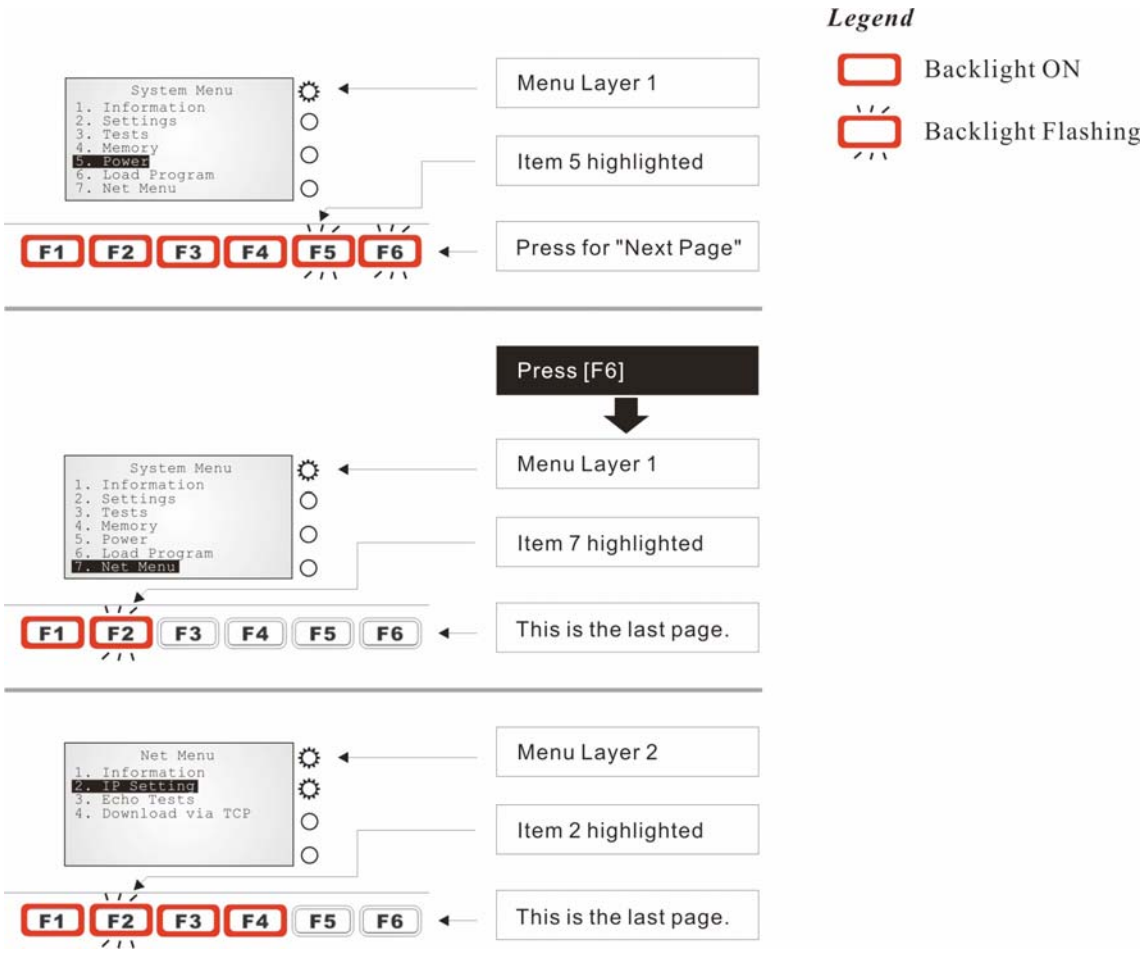



*Figure 23: Function keys as menu indicators*

# 4.3 System Menu

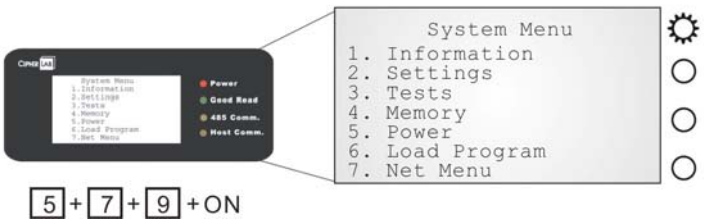
The System Menu is generated by a powerful utility, which offers an interface for engineers (programmers or system integrator) to view system information, change the configuration parameters, manage files and run diagnostics.

This menu is designed for engineering tests and maintenance ONLY. For this reason, the System Menu provides password protection to prevent unauthorized users from accidentally changing system settings.

***Warning! The System Menu is NOT for the use of any end users.***
***The system password helps ensure system safety and integrity.***

**How to access the System Menu?**

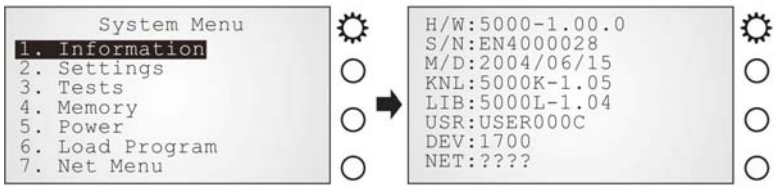
1. Lift the upper enclosure by unscrewing the two screws on top of the terminal.
2. Disconnect BOTH the line power and main battery.
3. Re-connect the main battery and simultaneously press [5] + [7] + [9] from the keyboard.
4. The System Menu is displayed on the LCD screen as shown below.
5. Re-connect the line power when configuration is done.




* Net Menu is available only when Ethernet card is present.

*Figure 24: System Menu*

## 4.3.1 Information



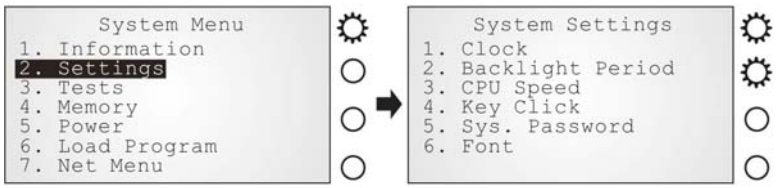

*Screen 2: System Menu> 1. Information*

The information provided here helps diagnose the system.

- H/W: Hardware version (PCB)
- S/N: Serial number of the terminal
- M/D: Manufacturing date
- KNL: Kernel version
- LIB: C library version
- USR: Application program version
- DEV: Code for optional hardware configurations, i.e. 1700. See Kernel> Information for device code.
- NET: Serial number of Ethernet card if installed

***Without a screen, this is not available on the 5000 terminals.***

## 4.3.2 Settings




*Screen 3: System Menu> 2. Settings*

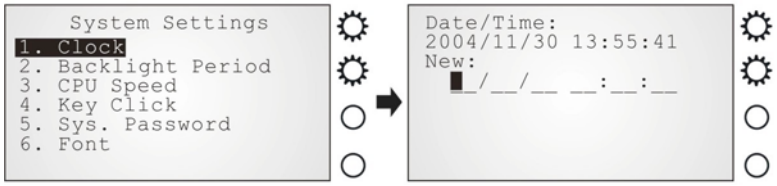
Here provides options to change the default settings.

| ***System settings*** | ***Default values*** |
|---|---|
| Clock | N/A |
| Backlight Period | 20 seconds |
| CPU Speed | Full speed |
| Key Click | Tone 2 |
| System Password | Open access |
| Font | System font |

*Table 18: Default system settings*

### *Settings > Clock*

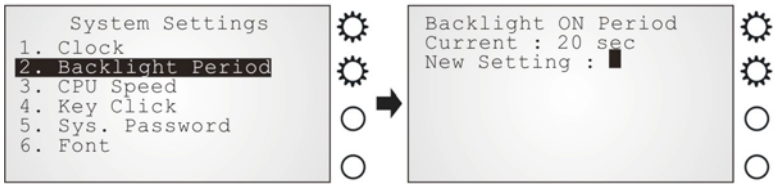
Set date and time for Real Time Clock.
Enter two digits for the year, i.e. 04 for 2004.




*Screen 4: System Menu> 2. Settings> 1. Clock*

## Settings > Backlight Period

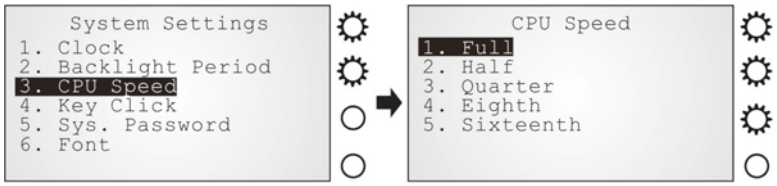
Set the backlight duration for the keypad and LCD.
Enter a value between 0 and 99999.




*Screen 5: System Menu> 2. Settings> 2. Backlight Period*

## Settings > CPU Speed

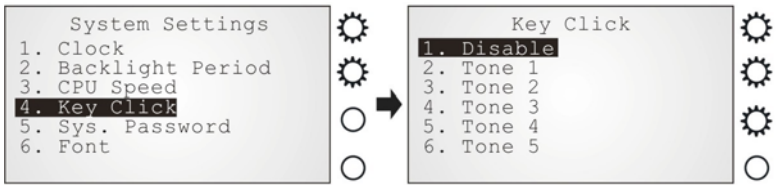
Set the CPU speed to save power if necessary. The current value is highlighted.
Options include: Full, Half, Quarter, Eighth and Sixteenth.




*Screen 6: System Menu> 2. Settings> 3. CPU Speed*

## Settings > Key Click

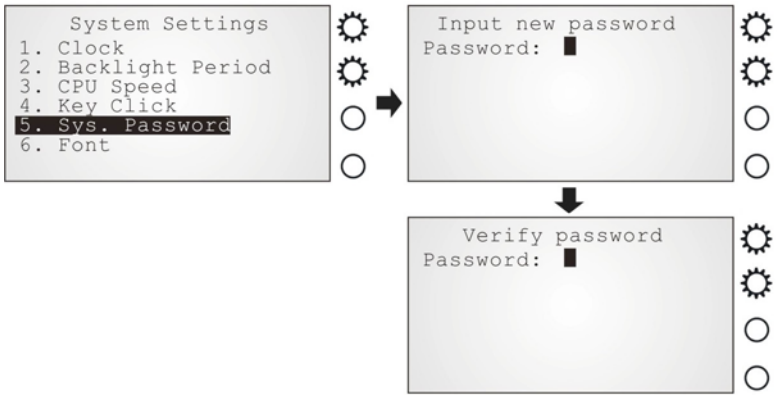
There is audible feedback for pressing a key on the keypad.
The current value is highlighted. Select a tone for the buzzer or mute it.




*Screen 7: System Menu> 2. Settings> 4. Key Click*

## Settings > System Password

Set a password to control user access to the System Menu.
The password consists of eight characters at most.
To disable a previous password, enter blank on the following screens.



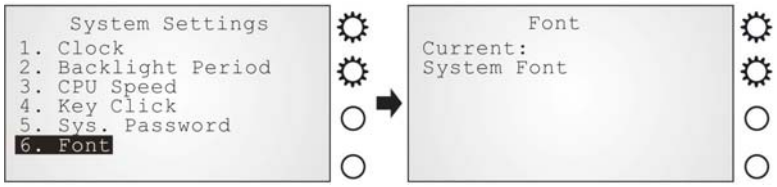

*Screen 8: System Menu> 2. Settings> 5. System Password*

## *Settings > Font*

Current font information can be viewed here.

- Default: System font
- Custom font file, if there is one

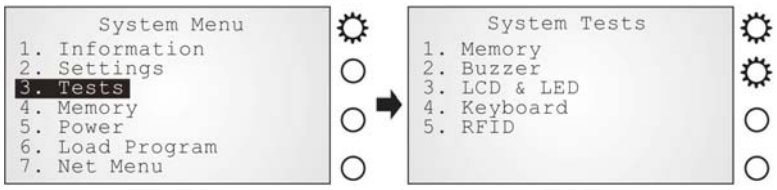
The font settings here can be changed if a multi-languages font file has been downloaded. (Press [2] / [8] to move down / up the menu of options.)




*Screen 9: System Menu> 2. Settings> 6. Font*

***Without a screen, this is not available on the 5000 terminals.***

# 4.3.3 Tests




*Screen 10: System Menu> 3. Tests*

Here provides functional tests for key parts:

## *Tests > Memory*

Test the data memory (SRAM), and the results will be shown on the screen.
Press any key to exit.

***Without a screen, this is not available on the 5000 terminals.***

***Warning! The contents of the data memory (SRAM) will be wiped out after test.***

## *Tests > Buzzer*

Test the buzzer with different frequency/duration combinations.
Press [Enter] to start. Press any key to stop and exit the test.

## Tests > LCD & LED

Test the LCD display and LED indicator.
Press [Enter] to start. Press any key to stop and exit the test.

***You may only be able to test the LED indicators on the 5000 terminals.***

## Tests > Keyboard

Test the rubber keys.
Press any key and its corresponding character will be shown on the screen.
Press [ESC] to stop and exit the test.

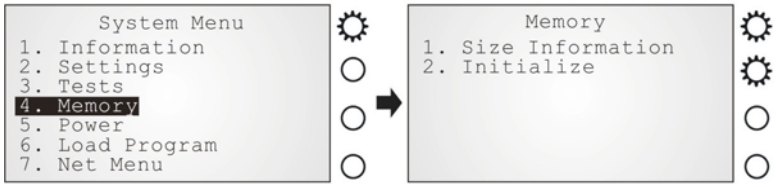
***Without a screen, this is not available on the 5000 terminals.***

## Tests > RFID

Test the reading performance of the RFID reader when a proximity card is present.
Press [ESC] to stop and exit the test.

***Without a screen, this is not available on the 5000 terminals.***

# 4.3.4 Memory




*Screen 11: System Menu> 4. Memory*

## *Memory > Size information*

Here provides information regarding the data and program memory:

- Base RAM (SRAM for data memory)
- Memory Card (SRAM for data memory)
- Flash (for program memory)

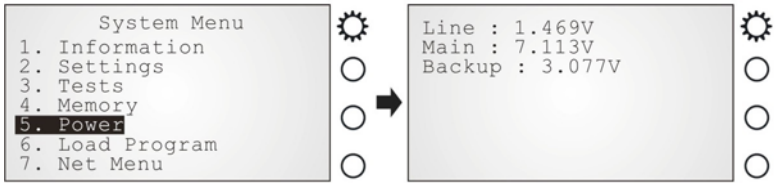
***Without a screen, this is not available on the 5000 terminals.***

## *Memory > Initialize*

Perform task initializing the data memory (Base RAM or Memory Card).

***Warning! The contents of the data memory (SRAM) will be wiped out after memory initialization.***

## 4.3.5 Power



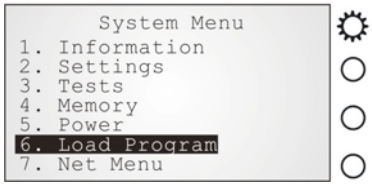

*Screen 12: System Menu> 5. Power*

Here shows current voltage consumption for Line / Main / Backup.

- Line: Line power (DC) status.
- Main: Main battery status.
  The battery pack is a standby power source when line power is down.
- Backup: Backup battery status.
  The button cell is used to retain data in SRAM and maintain RTC.

***Without a screen, this is not available on the 5000 terminals.***

# 4.3.6 Load Program




*Screen 13: System Menu> 6. Load Program*

The terminal must be configured correctly for downloading either of the following:

- Program update
- New application program
- Font file (only RS-232 interface is allowed)

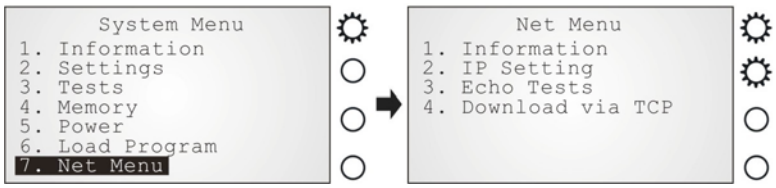
| | | |
|---|---|---|
| ***Interfaces:*** | RS-232 | Default parameters are 115200, none, 8, 1.<br>The communication parameters at PC end should be set accordingly. |
| | Ethernet | See System Menu> Net Menu> Download via TCP/IP |

*Table 19: Downloading interfaces*

**Results**

- Success: the new program or font file will be activated right after downloading.
- Failure: the terminal will resume to the current application program or font

# 4.3.7 NET Menu




*Screen 14: System Menu> 7. Net Menu*

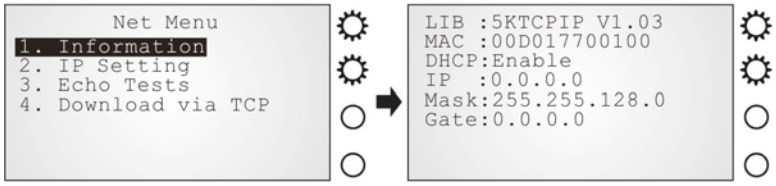
This submenu is for IEEE 802.3 10/100Base-T Ethernet networking, and is available only when an Ethernet card is installed. Parameters must be configured correctly.

***The menu can only be shown when the 5kTCPIP.LIB is linked.***

## *Net Menu > Information*

Information of network configuration can be viewed here.

- LIB: Version of 5KTCPIP.LIB
- MAC: MAC ID of the installed Ethernet (TCP/IP) module
- DHCP: DHCP being enabled or disabled
- IP: IP address of the terminal
- Mask: Subnet Mask
- Gate: Default Gateway




*Screen 15: System Menu> 7. Net Menu> 1. Information*

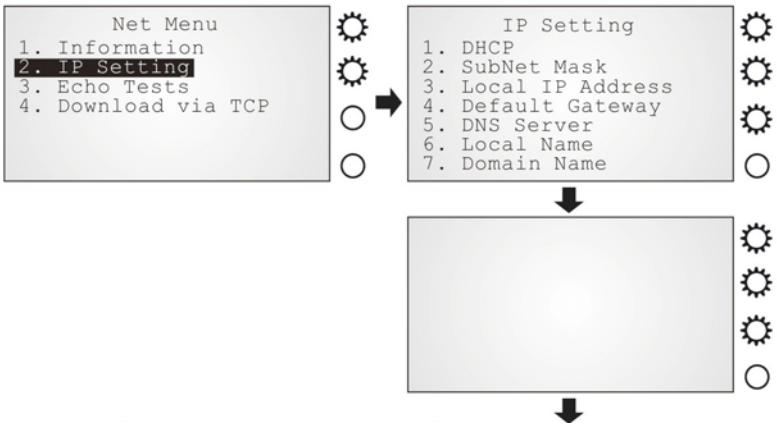
***Without a screen, this is not available on the 5000 terminals.***

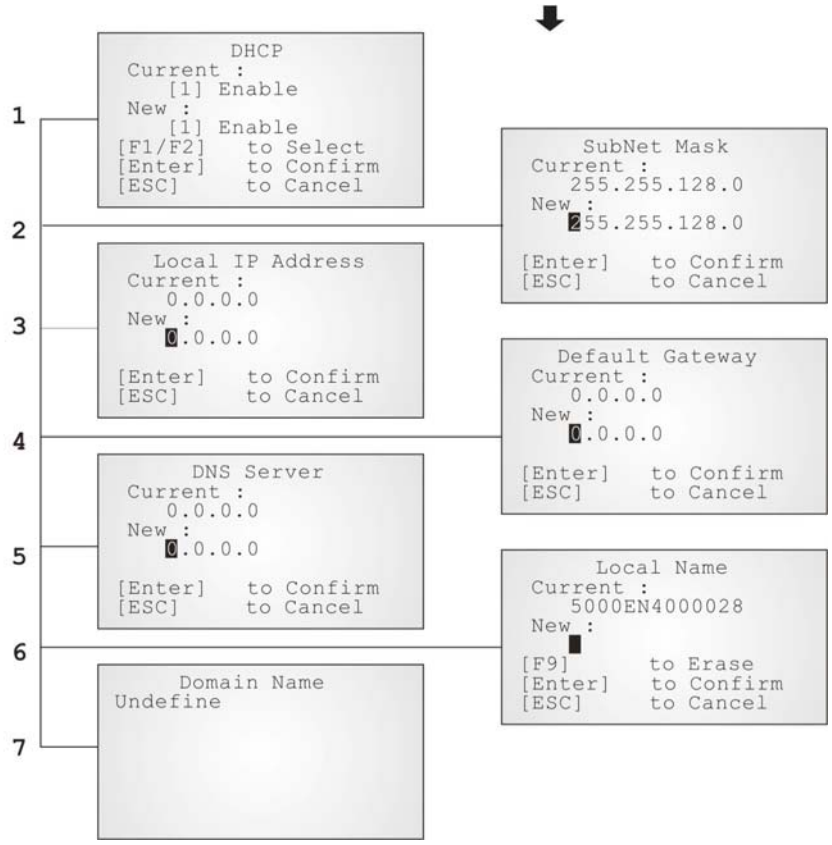
## *Net Menu > IP Setting*

Set network parameters:

- DHCP: Options – Enable or Disable
- SubNet Mask: Enter a new Mask IP, if necessary.
- Local IP Address: Enter a new address for the terminal, if necessary.
- Default Gateway: Enter a new address for the default Gateway, if necessary.
- DNS Server: Enter a new address for the DNS server, if necessary.
- Local Name: Enter a name for identifying the terminal.
- Domain Name: The domain name of the host is shown here.

***All of the setting could be obtained form DHCP server if DHCP is activated***



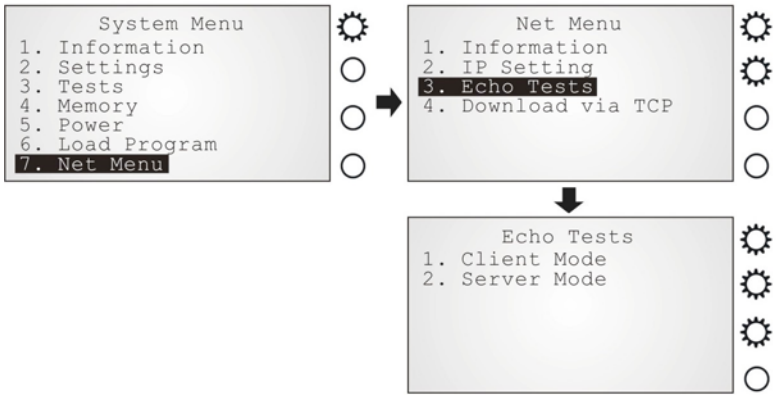



*Screen 16: System Menu> 7. Net Menu> 2. IP Setting*

## Net Menu > Echo Tests

Echo tests are used for verify connectivity. Press [ESC] to stop and exit the test.

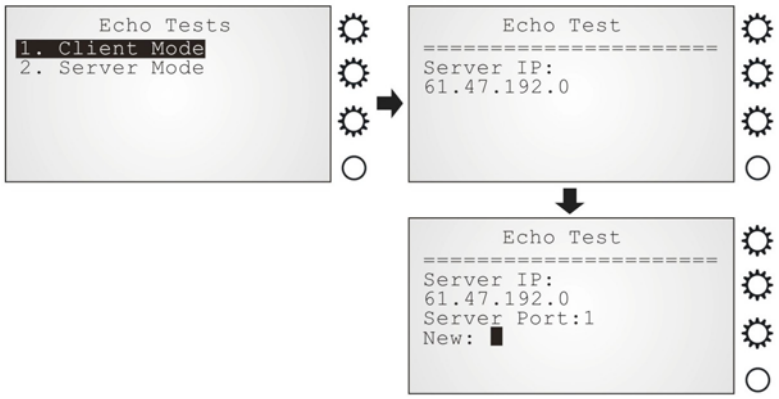
***You also need a test utility on PC to test the networking.***




*Screen 17: System Menu> 7. Net Menu> 3. Echo Tests*

- Client Mode: Set the terminal as a client.
  Enter the IP address of a server that connection is desired.
  Followed by an attempt to make connection with the access point.

- Server Mode: Set the terminal as a server.
  Followed by an attempt to make connection with the access point.




*Screen 18: System Menu> 7. Net Menu> 3. Echo Tests: Client Mode*

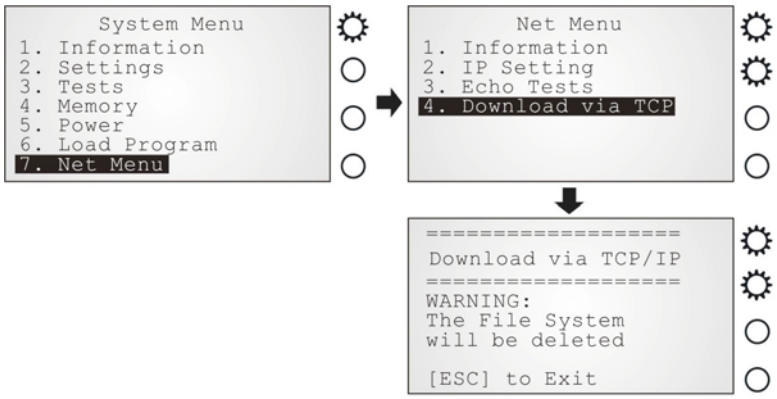
## *Net Menu > Download via TCP/IP*

If an Ethernet card is installed, the terminal can download new application program or program update via TCP/IP.

***You also need a downloading utility on PC to download program through network.***

**Results**

- Success: the new program will be activated right after downloading.
- Failure: the terminal will resume to the current application program




*Screen 19: System Menu> 7. Net Menu> 4. Download via TCP/IP*

# 4.4 Program Manager

The 5000/5100 terminals support multiple applications and languages. In the menu of Program Manager, it can download up to seven programs and one of them is made active.

***Warning! The Program Manager menu is NOT for the use of any end users.***

### How to access the Program Manager?

1. Lift the upper enclosure by unscrewing the two screws on top of the terminal.
2. Disconnect BOTH the line power and main battery.
3. Re-connect the main battery and simultaneously press [5] + [8] from the keyboard.
4. The Program Manager menu is displayed on the LCD screen as shown below.
5. Re-connect the line power when configuration is done.

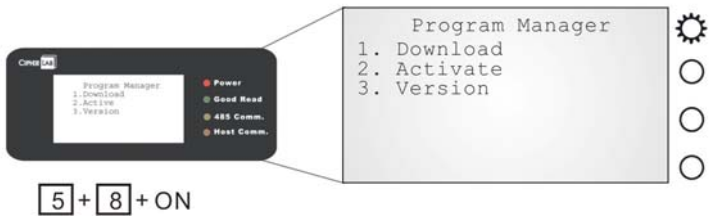
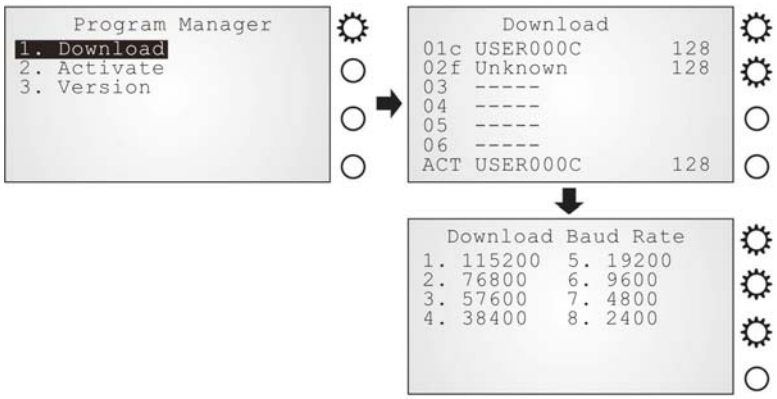



*Figure 25: Program Manager menu*

***Program Manager Menu, which is generated by 51pm.shx, is unavailable by default. Please download 51pm.shx in the System Manu first.***

# 4.4.1 Download




*Screen 20: Program Manager> 1. Download*

Multiple programs as well as custom font file can be downloaded through RS-232 interface. There is a full list of programs and font file that are currently stored in the terminal as follows.

| | | | |
|---|---|---|---|
| 01 ~ 06 | File Name | Volume | Press [1 ~ 6] + [Enter] |
| ACT | File Name | Volume | [7] + [Enter] or [F6] + [F2] |

*Table 20: Listing of multiple programs and font*

The terminal can store up to seven programs (including the one in active memory) and one font file (may not be shown in this list).

- Spare application programs (max. 6): baud rate selectable
- Active application program (1): default baud rate 115200, none, 8, 1
- Font file (1): default baud rate 115200, none, 8, 1

***A slot number followed by "c": the program is written by C language.***
***A slot number followed by "f": this is a font file.***

***Only RS-232 interface is allowed.***

## *Spare application programs*

| ***Empty slot:*** |
|---|
| 1. Select an empty slot by pressing the corresponding number and then [Enter].<br>2. Select baud rate for downloading. Set matching parameters at PC end.<br>3. Connect cable and wait connecting…<br>4. To abort the action, press [ESC]. Then press [ESC] again to return to the menu. |
| ***Occupied slot:*** |
| If no available slots, you'll have to replace one program with the new one.<br><br>1. Select a program that you want to delete by pressing the corresponding number and then [Enter].<br>2. The program information is displayed on the screen. Press [Alpha] to enter the capital mode. Then press [C].<br>3. Select baud rate for downloading. Set matching parameters at PC end.<br>4. Connect cable and wait connecting…<br>5. To abort the action, press [ESC]. Then press [ESC] again to return to the menu. From the menu, you'll find the program is deleted but no new program is present.<br><br>If you simply want to delete a program, press [D] in step 2. |

*Table 21: Downloading spare programs*

***[C], [D]: press the keypad to produce C or D when in the capital mode A.***

## *Active application program or font file*

| ***The active slot:*** |
| --- |
| 1. Select the active program (may be an empty slot) by pressing the corresponding number (that is 7) and then [Enter].<br>2. Set matching parameters at PC end: 115200, none, 8, 1<br>3. Connect cable and wait connecting…<br>4. If the downloaded program is an application, it will replace the active program and come into effect immediately.<br>5. If it is a font file, then the current active program is still in use. |

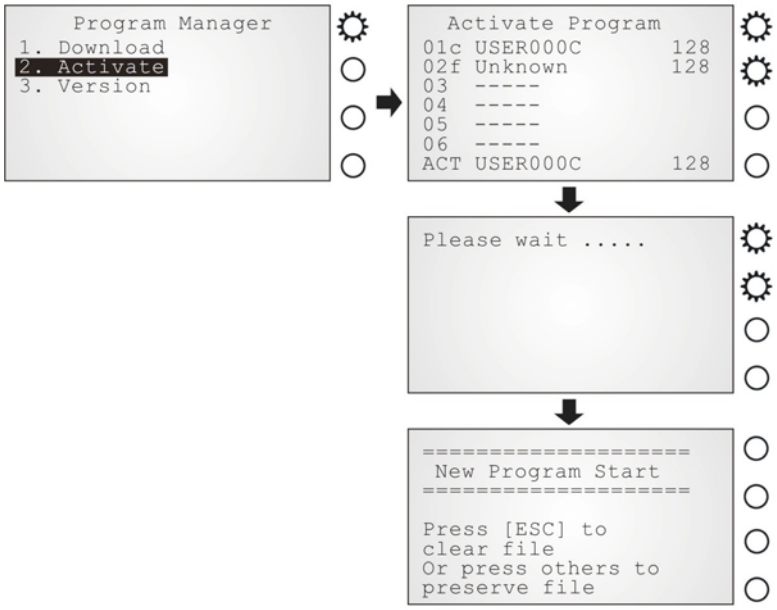
*Table 22: Downloading active program or font*

***No font file will replace the active application program.***

The new font file may not be shown in the program list if all slots are taken by application programs, but you can view font information under System Menu> Settings> Font.

***>> Also see Section 4.3.2 Settings***

## 4.4.2 Activate




*Screen 21: Program Manager> 2. Activate*

The list shows the entire spare programs stored in the terminal. From the list, you can select from 01 to 06 and activate one of them.

l When an application program is activated, it will be copied to the active memory and replace the old one.

The <New Program Start> screen instructs that “Press [ESC] to clear file”. It means the file system in the SRAM will be cleared out when pressing [ESC]. Then there will be no data (transactions, settings, etc.) stored in the terminal when the new program comes into effect. To keep the data, simply press any other key.

l When a font file is activated, it will replace the system font. The active application program will remain intact.

## 4.4.3 Version

Here provides information about the version of Program Manager.

***Without a screen, this is not available on the 5000 terminals.***

# 4.5 Kernel Menu

The Kernel Menu resides in the innermost core of the system. It has the highest security and is always protected by the system. When the application program is corrupted and the System Menu fails, the Kernel Menu provides an access to fix the system.

***Warning! The Kernel Menu is NOT for the use of any end users.***

**How to access the Kernel Menu?**

1. Lift the upper enclosure by unscrewing the two screws on top of the terminal.
2. Disconnect BOTH the line power and main battery.
3. Re-connect the main battery and simultaneously press [1] + [5] + [7] from the keyboard.
4. The Kernel Menu is displayed on the LCD screen as shown below.
5. Re-connect the line power when configuration is done.

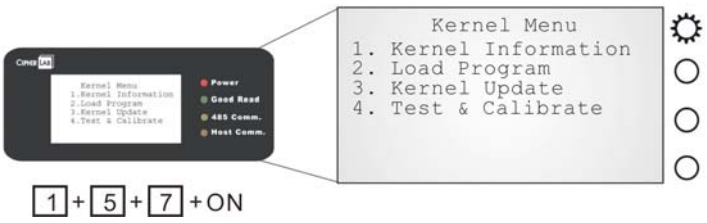



*Figure 26: Kernel Menu*

## 4.5.1 Information

The information provided here helps diagnose the system.

- H/W: Hardware version
- S/N: A unique serial number for the device
- M/D: Manufacturing date
- KNL: Kernel version
- DEV: Code for optional hardware configurations, i.e. 1700

| ***1*** | ***7*** | ***0*** | ***0*** |
|---|---|---|---|
| Type of Reader Module | Type of LAN Module | Reserved | Reserved |
| 0= none<br>1= EM<br>2= Mifare | 0= none<br>7= Ethernet | | |

*Table 23: Device code explained*

***Without a screen, this is not available on the 5000 terminals.***

## 4.5.2 Load Program

The terminal must be configured correctly for downloading either of the following:

- Program update
- New application program
- Font file

1. Connect RS-232 cable.
2. Set communication parameters at PC end: 115200, none, 8, 1.
3. Enter Kernel Menu> Load Program.
   The system is ready to download the program to the active slot.

***Only RS-232 interface is allowed.***

**Results**

- Success: the new program or font file will be activated right after downloading.
- Failure: the terminal will resume to the current application program or font

## 4.5.3 Kernel Update

The Kernel might be changed for improving performance or other reasons, and an update is necessary.

1. Connect cable.
2. Set communication parameters at PC end: 115200, none, 8, 1.
3. Enter Kernel Menu> Kernel Update.
   The system is ready to update the Kernel firmware.

***Only RS-232 interface is allowed.***

## 4.5.4 Test & Calibrate

These tools are provided for manufacturing use. No user definition is allowed.

- Burn-In Test
- Calibrate RTC

***Warning! This is NOT for the use of any end users.***

# 5. MANAGING 5000/5100

Depending on the application program downloaded to the terminals, managing the 5000/5100 terminals at PC end can be very flexible and simple.

***For details, please see relevant documents such as Programming Guide.***

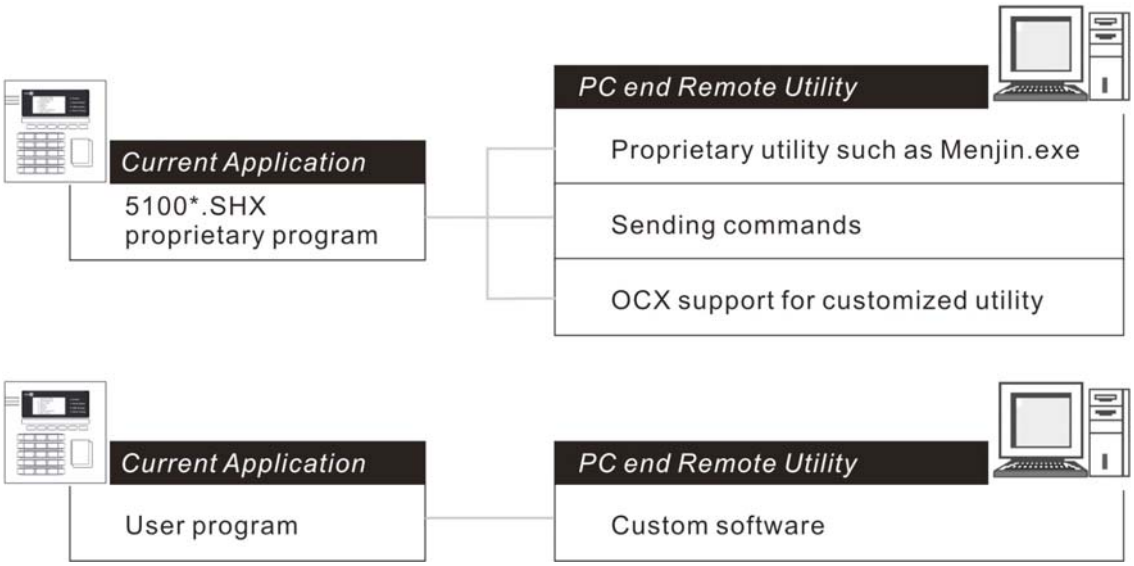



*Figure 27: Remote management*

# 5.1 For proprietary applications

For any preloaded application program (5100*.SHX), we provide several ways for managing the terminal from PC end.

## Management Utilities

This is application dependant. For example, Menjin.exe is developed for Access Control application.

## Commands

Sending commands serves as an alternative to manage the terminals.

## OCX Support

Customized utilities can be developed in an efficient way.

# 5.2 For custom applications

For user-defined application programs, management software is to be developed by your own system programmers.

## Programming Support

For development of custom application software, proprietary BASIC or C complier is available through licensing agreement, as well as libraries.

# SPECIFICATIONS

| | |
|---|---|
| ***Power*** | |
| Line power: | 12 V ± 5% DC at 1000 mA |
| Main battery: | Rechargeable 7.4 V, 2000 mAh Li-ion battery pack (optional) |
| Backup battery: | Rechargeable 3.0 V, 7 mAh Lithium button cell |
| ***CPU*** | |
| 16-bit CPU: | Tunable clock, up to 22 MHz |
| ***Memory*** | |
| Flash: | 2 MB program memory |
| SRAM: | Standard 256 KB on-board data memory<br>Memory card (optional) |
| ***Programming Support*** | |
| Components: | OCX |
| Compilers: | BASIC and C |
| ***Environment*** | |
| Humidity: | Operating: 20% to 90% non-condensing<br>Storage: 10% to 95% non-condensing |
| Temperature: | Operating: 0 to 45 °C<br>Storage: -20 to 60 °C |
| ***EMC certified*** | |
| FCC | Class B |
| CE | Class B |
| C-Tick | Class B |

| | |
|---|---|
| ***Enclosure*** | |
| Material & Color: | ABS plastic<br>Black |
| Dimensions: | 150 mm (L) x 150 mm (W) x 50 mm (H) |
| Weight: | Approx. 1.6 Kg (including one battery pack) |
| ***Input Devices*** | |
| Reader: | Built-in RFID reader, Mifare or EM type (optional)<br>Also allow for one external TTL RS-232 reader |
| Keyboard: | 21 keys rubber including 6 function keys, backlit, programmable<br>One external Mini Din connector provided by keyboard module |
| ***Display*** | |
| Graphic LCD: | 128 x 64 pixels, LED backlit, programmable –<br>4 lines by 8 characters for Chinese characters |
| ***Indicators*** | |
| LED: | 4 LEDs, programmable |
| Buzzer: | Low power transducer type, 1 KHz to 4 KHz, programmable |
| ***Interfaces*** | |
| RS-232: | Master-to-Slave connection |
| RS-485: | Peer-to-Peer connection |
| RJ-45 port: | Ethernet networking (optional) |
| ***Digital Inputs/outputs*** | |
| DI: | 4 sets of DI signal |
| DO: | 4 sets of DO signal |

# TROUBLESHOOTING

| ***The terminal cannot accept valid cards…*** |
|---|
| Regarding power – |
| Check if the power adaptor is plugged into a wall outlet.<br>Check if the outlet is working.<br><br>If the problem persists, check if the wiring inside the terminal is correct and secured. |
| Regarding memory – |
| Check if memory buffer is full. Then clean buffer by downloading data to a computer. |
| Regarding the reader – |
| Check if the selected reader type in your application matches the default setting.<br>***>> Also see Section 4.3.1 Information: DEV***<br>Check if the reader is working.<br>***>> Also see Section 4.3.3 Tests: RFID***<br>If the problem persists, re-connect the power and perform test. |

| ***The terminal cannot transmit or receive data to and from a host…*** |
|---|
| For RS-232 connection – |
| Check if the RS-232 connection is secured and properly wired.<br>Check if parameters are correct.<br>Make sure the serial port parameters on the host are configured to match the default serial parameters.<br><br>If the problem persists, check if the wiring inside the terminal is correct and secured. |
| For Ethernet networking – |
| Check if the Ethernet cable is secured at both ends.<br>Check if parameters are correct.<br>***>> Also see Section 4.3.7 NET Menu*** |

| ***The keyboard input seems not working properly…*** |
|---|
| Test keyboard.<br>***>> Also see Section 4.3.3 Tests: Keyboard***<br>If the problem persists, re-connect the power and perform test. |

| ***The external devices controlled by DI/DO signals are not working properly…*** |
|---|
| Check if the device is properly wired to the terminal blocks.<br><br>If the problem persists, re-connect the power and perform test. |

| ***About abnormal response…*** |
|---|
| The LEDs or LCD seem not working properly – |
| Test components.<br>***>> Also see Section 4.3.3 Tests: LCD & LED***<br>If the problem persists, re-connect the power and perform test. |
| The buzzer seems not working properly – |
| Test audible indicators.<br>***>> Also see Section 4.3.3 Tests: Buzzer***<br>If the problem persists, re-connect the power and perform test. |
| The terminal seems not working properly – |
| First upload all data to a computer, and then test memory.<br>***>> Also see Section 4.3.3 Tests: Memory***<br>If the problem persists, re-connect the power and perform test. |

# APPENDIX I – MOUNTING TEMPLATE

This mounting template is provided in actual size (1:1 scale).

1. Place this paper on the place you desire to mount the terminal.
2. Use paper tape to attach it on the surface.
3. Then use a power drill to drill holes on the four corners.

***The size of these holes is 6mm in diameter and 21mm in depth.***

***Make sure that your printout doesn't zoom in/out during printing.***

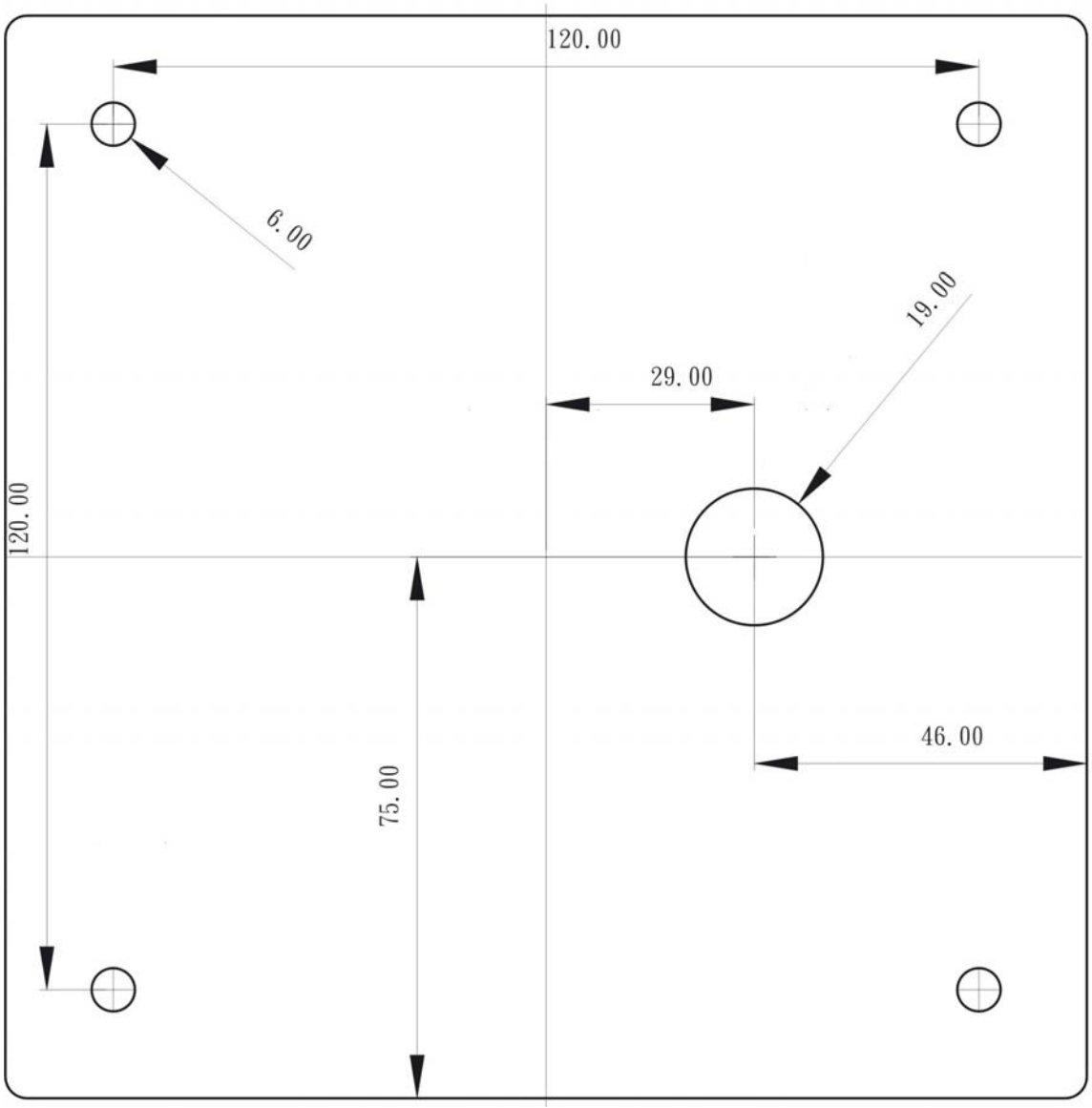



*Figure 28: Mounting template*